417

TRANSACTIONS

OF THE

AMERICAN

SURGICAL ASSOCIATION.

VOLUME THE TENTH.

EDITED BY

J. EWING MEARS, M.D.,

RECORDER OF THE ASSOCIATION.

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OFFICERS

OF THE

AMERICAN SURGICAL ASSOCIATION,

Elected at the Meeting, June 2, 1892.

PRESIDENT.

NICHOLAS SENN, M.D.

VICE-PRESIDENTS.

CHARLES B. PORTER, M.D.
W. W. KEEN, A.M., M.D.

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ROBERT F. WEIR, M.D.

LIST OF THE PRESIDENTS

OF THE

ASSOCIATION FROM THE TIME OF ITS INSTITUTION.

ELECTED

1880. SAMUEL DAVID GROSS, M.D., LL.D., D.C.L. Oxon., LL.D. Cantab., LL.D. Edin.—Founder of the Association.

1883. EDWARD MOTT MOORE, M.D., LL.D.

1884. WILLIAM THOMPSON BRIGGS, M.D.

1885. MOSES GUNN, A.M., M.D., LL.D.

1886. HUNTER McGUIRE, M.D., LL.D.

1887. D. HAYES AGNEW, M.D., LL.D.

1888. DAVID WILLIAMS CHEEVER, M.D.

1889. DAVID W. YANDELL, M.D.

1890. CLAUDIUS HENRY MASTIN, M.D., LL.D.

1891. PHINEAS SANBORN CONNER, M.D., LL.D.

1892. NICHOLAS SENN, M.D.

FELLOWS

OF THE

AMERICAN SURGICAL ASSOCIATION.

MAY, 1892.

* Denotes Original Fellows.

ELECTED.

1890. ABBE, ROBERT, M.D., 11 West Fiftieth Street, New York. Surgeon to St. Luke's Hospital, New York.

1890. ALLIS, OSCAR H., M.D., 1604 Spruce Street, Philadelphia. Surgeon to the Presbyterian Hospital.

*1880. ASHHURST, JOHN, Jr., M.D., 2000 West DeLancey Place, Philadelphia. Professor of Surgery and of Clinical Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania Hospital; Senior Surgeon to the Children's Hospital of Philadelphia.

1882. BARTON, JAMES M., A.M., M.D., 1337 Spruce Street, Philadelphia. Surgeon to the Jefferson Medical College Hospital and to the Philadelphia Hospital.

1882. BILLINGS, JOHN SHAW, M.D., LL.D. Edin. and Harv., Army Medical Museum, Seventh and B Streets (S.W.), Washington, Surgeon U. S. Army. *Member of Council*, 1884–89.

1882. BONTECOU, REED BROCKWAY, M.D., 82 Fourth Street, Troy, N. Y. Surgeon to the Marshall Infirmary, Troy, N. Y.

1890. BRADFORD, E. H., M.D., 216 Beacon Street, Boston. Visiting Surgeon to the Boston City, the Children's, and the Samaritan Hospitals; Instructor in Clinical Surgery in the Harvard Medical School.

ELECTED

*1880. Bramble, D. D., M.D., 169 Broadway, Cincinnati, Ohio.

*1880. Briggs, William Thompson, M.D., corner Summer and Union Streets, Nashville, Tenn. Professor of Surgery in the Medical Department of the University of Nashville and Vanderbilt University; Surgeon to the University Hospital of Nashville and to the Hospital of the Good Shepherd. *President*, 1884.

*1880. Brinton, John H., M.D., 1423 Spruce Street, Philadelphia. Professor of the Practice of Surgery and of Clinical Surgery in the Jefferson Medical College of Philadelphia; Surgeon to St. Joseph's Hospital, Philadelphia. *Treasurer*, 1884–85.

1882. Bull, William Tillinghast, M.D., 35 West Thirty-fifth Street, New York. Adjunct Professor of the Practice of Surgery and of Clinical Surgery in the College of Physicians and Surgeons, New York; Surgeon to the New York Hospital and to St. Luke's Hospital; Consulting Surgeon to the Hospital for Ruptured and Crippled and to the New York Cancer Hospital.

1889. Cabot, Arthur T., 3 Marlborough Street, Boston, Mass. Surgeon to the Massachusetts General Hospital.

1885. Carmalt, William H., A.M., M.D., 87 Elm Street, New Haven, Conn. Professor of Surgery in Yale University; Surgeon to the New Haven Hospital.

1882. Cheever, David Williams, M.D., 239 Boylston Street, Boston, Mass. Professor of Surgery in Harvard University; Surgeon to the Boston City Hospital. *President*, 1888.

1882. Comingor, John A., M.D., 77½ South Illinois Street, Indianapolis, Ind. Professor of Orthopedic and Clinical Surgery in the Central College of Physicians and Surgeons, Indianapolis, Indiana.

*1880. Conner, Phineas Sanborn, M.D., LL.D., *President*, 159 West Ninth Street, Cincinnati, Ohio. Professor of Surgery in the Medical College of Ohio; Professor of Surgery, Dartmouth Medical College; Surgeon to the Cincinnati Hospital and to the Good Samaritan Hospital, Cincinnati. *Member of Council*, 1883. *Treasurer*, 1885–92.

ELECTED.

1883. DANDRIDGE, NATHANIEL PENDLETON, M.D., 148 Broadway, Cincinnati, Ohio. Professor of Practice of Surgery and of Clinical Surgery in Miami Medical College, Cincinnati.

*1880. DAWSON, WILLIAM WIRT, M.D., corner Third and Broadway, Cincinnati, Ohio. Professor of Clinical Surgery in the Medical College of Ohio; Surgeon to the Hospital of the Good Samaritan, Cincinnati. *Vice-President*, 1883.

1880. DEAVER, JOHN B., M.D., 120 South Eighteenth Street, Philadelphia. Professor of Applied Anatomy University of Pennsylvania; Surgeon to the Philadelphia, German, and St. Agnes's Hospitals, Philadelphia.

1882. DENNIS, FREDERIC SHEPARD, M.D., 542 Madison Avenue, New York. Professor of the Principles and Practice of Surgery in the Bellevue Hospital Medical College; Surgeon to the Bellevue Hospital and to St. Vincent's Hospital; Consulting Surgeon to the Hospital for Ruptured and Crippled, New York. *Vice-President*, 1887. *Member of Council*, 1889.

1882. DUNOTT, THOMAS J., M.D., 132 Walnut Street, Harrisburg, Pa. Surgeon to the Harrisburg Hospital.

1882. FORBES, WILLIAM SMITH, M.D., 1704 Walnut Street, Philadelphia. Professor of Anatomy in the Jefferson Medical College of Philadelphia; Surgeon to the Protestant Episcopal Hospital of Philadelphia.

1891. FOWLER, GEORGE R., M.D., 302 Washington Avenue, Brooklyn, N. Y.

1882. GAY, GEORGE WASHINGTON, M.D., 665 Boylston Street, Boston, Mass. Surgeon to the Boston City Hospital; Clinical Instructor in Surgery in Harvard University. *Member of Council*, 1882.

1892. GERRISH, FREDERICK H., M.D., 675 Congress Street, Portland, Maine. Surgical Instructor in Portland School of Medicine; Professor of Anatomy in Medical Department of Bowdoin College.

1890. GERSTER, ARPAD G., M.D., 56 East Twenty-fifth Street, New York. Professor of Surgery in the New York Polyclinic; Surgeon to the German and Mt. Sinai Hospitals, New York.

ELECTED.

1882. Gregory, Elisha H., M.D., LL.D., 1006 Olive Street, St. Louis, Mo. Professor of Surgery in the St. Louis Medical College; Surgeon to the St. Louis Hospital, St. Louis. *Vice-President*, 1884.

1892. Halsted, William S., 1201 Eutaw Place, Baltimore, Md., Surgeon to Johns Hopkins Hospital.

1889. Homans, John, M.D., 161 Bacon Street, Boston, Mass. Visiting Surgeon to the Massachusetts General Hospital.

1882. Isham, Ralph N., A.M., M.D., 321 Dearborn Avenue, Chicago. Professor of the Principles and Practice of Surgery in the Chicago Medical College (Medical Department of the Northwestern University).

*1880. Keen, William Williams, A.M., M.D., LL.D., 1729 Chestnut Street, Philadelphia. Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College of Philadelphia; Surgeon to St. Agnes's Hospital, Philadelphia.

1890. Lane, Levi Cooper, *Vice-President*, San Francisco, Cal. Professor of Surgery in the Cooper Medical College, San Francisco.

1889. Lange, Frederick E., 691 Lexington Avenue, New York.

*1880. Marks, Solon, M.D., 136 Wisconsin Street, Milwaukee, Wisconsin. Surgeon to St. Mary's Hospital, Milwaukee.

*1880. Mastin, Claudius Henry, M.D., LL.D., Univ. of Penna., Northeast corner Joachim and Conti Streets, Mobile, Ala. *Vice-President*, 1889; *President*, 1890; *Member of Council*, 1891.

1887. Mastin, William McDowell, M.D., northeast corner Joachim and Conti Streets, Mobile, Ala.

1892. McBurney, Charles, New York.

1883. McCann, James, M.D., 928 Penn Avenue, Pittsburg, Pa. Surgeon to the Western Pennsylvania Hospital, Pittsburg.

1882. McGraw, Theodore A., M.D., 107 West Fort Street, Detroit, Michigan. Professor of Surgery in the Detroit Medical College; Surgeon to St. Mary's Hospital and to the Harper Hospital, Detroit.

ELECTED.

*1880. McGuire, Hunter, M.D., LL.D., 513 East Grace Street, Richmond, Va. *Member of Council*, 1880–85; *President*, 1886.

*1880. Mears, J. Ewing, A.M., M.D., *Recorder*, 1881–91, 1429 Walnut Street, Philadelphia. Professor of Anatomy and of Clinical Surgery in the Pennsylvania College of Dental Surgery; Surgeon to St. Agnes's Hospital, Philadelphia.

1885. Michael, Jacob Edwin, A.M., M.D., 201 West Franklin Street, Baltimore, Md. Surgeon to the University Hospital; Consulting Surgeon to the Presbyterian Eye, Ear, and Throat Charity Hospital, Baltimore.

*1880. Moore, Edward Mott, M.D., LL.D., 74 South Fitzhugh Street, Rochester, N. Y. Surgeon to St. Mary's Hospital of Rochester. *Vice-President*, 1882; *President*, 1884.

*1880. Morton, Thomas George, M.D., 1421 Chestnut Street, Philadelphia. Surgeon to the Pennsylvania Hospital, to the Orthopedic Hospital, and to the Jewish Hospital, Philadelphia.

1886. Mudd, Henry H., M.D., 500 North Jefferson Street, St. Louis, Mo. Professor of Surgical Anatomy and Clinical Surgery in St. Louis Medical College; Surgeon to St. Luke's Hospital, St. Louis.

1882. Nancrede, Charles Beylard, M.D., Ann Arbor, Mich. Professor of Surgery in the University of Michigan, Ann Arbor, Mich. *Vice-President*, 1889.

1882. Norris, Basil, M.D., Surgeon U. S. Army, "Occidental Hotel," San Francisco.

1882. Owens, John E., M.D., 1806 Michigan Avenue, Chicago. Professor of Principles and Practice of Surgery and Clinical Surgery in the Chicago Medical College; Attending Surgeon to St. Luke's Hospital, Chicago.

*1880. Packard, John H., M.D., 1924 Spruce Street, Philadelphia. Surgeon to the Pennsylvania Hospital and to St. Joseph's Hospital, Philadelphia. *Treasurer*, 1880–83.

*1880. Pancoast, William Henry, M.D., 1100 Walnut Street, Philadelphia. Professor of Anatomy in the Medico-Chirurgical College of Philadelphia.

ELECTED.

1885. Park, Roswell, A.M., M.D., 510 Delaware Avenue, Buffalo, N. Y. Professor of Surgery in the Medical Department of the University of Buffalo; Surgeon to the Buffalo General Hospital; Consulting Surgeon to the Fitch Accident Hospital.

1889. Pilcher, Lewis S., 145 Gales Avenue, Brooklyn, N. Y. Professor of Clinical Surgery in the Post-Graduate Medical School, New York.

1887. Porter, Charles Burnham, A.B., A.M., M.D. Harv., 5 Arlington Street, Boston, Mass. Professor of Clinical Surgery in Harvard Medical School; Surgeon to the Massachusetts General Hospital.

1882 Porter, William Gibbs, M.D., 1118 Spruce Street, Philadelphia. Surgeon to the Presbyterian Hospital and to the Philadelphia Hospital.

1882. Prewitt, Theodore F., M.D., 2126 Olive Street, St. Louis, Mo. Professor of the Principles and Practice of Surgery and of Clinical Surgery in the Missouri Medical College; Surgeon to St. John's Hospital, St. Louis. *Vice-President*, 1886.

1886. Ransohoff, Joseph, M.D., F.R.C.S. Eng., 296 Walnut Street, Cincinnati, Ohio. Professor of Anatomy in the Medical College of Ohio; Surgeon to the Cincinnati Hospital and to the Good Samaritan Hospital, Cincinnati.

1887. Richardson, Maurice Howe, A.B., M.D, 224 Beacon Street, Boston, Mass. Surgeon to the Massachusetts General Hospital; Assistant Professor of Anatomy in Harvard Medical School.

1882. Roberts, John B., M.D., *Treasurer*, 1627 Walnut Street, Philadelphia. Professor of Anatomy and Surgery in the Philadelphia Polyclinic; Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Methodist Hospital and to the Jewish Hospital. *Vice-President*, 1888.

1882. Rushmore, John Dikeman, M.D., 129 Montague Street, Brooklyn, N. Y. Professor of Surgery in the Long Island College Hospital; Surgeon to the Brooklyn Hospital, to

ELECTED.

St. Peter's Hospital, and to the Eye and Ear Hospital, Brooklyn.

*1880. Russell, Thomas Pember, M.D., Oshkosh, Wisconsin.

*1880. Sayre, Lewis Albert, M.D., 285 Fifth Avenue, New York, Professor of Orthopedic Surgery in the Bellevue Hospital Medical College; Consulting Surgeon to the Bellevue Hospital, to the Charity Hospital, to St. Elizabeth's Hospital, and to the Home for Incurables, New York.

1882. Senn, Nicholas, M.D., 532 Dearborn Avenue, Chicago, Illinois, Professor of the Principles of Surgery and Clinical Surgery in Rush Medical College; Attending Surgeon to the Presbyterian Hospital; Surgeon-in-Chief to St. Joseph's Hospital, Chicago, Illinois.

1882. Smith, Alan Penniman, M.D., 24 West Franklin Street, Baltimore, Md. Surgeon to St. Vincent's Hospital, to the Union Protestant Infirmary, to the Hebrew Hospital, to St. Agnes's Hospital, to the Maryland Eye, Ear, and Throat Hospital, and to the Hospital for Diseases of Women, Baltimore, Maryland.

1882. Smith, Stephen, A.M., M.D., LL.D., 574 Madison Avenue, New York. Professor of Clinical Surgery in the University Medical College of New York; Surgeon to Bellevue Hospital and to St. Vincent's Hospital, New York. *Vice-President*, 1890.

1889. Stimson, Lewis A., 34 E. Thirty-third Street, New York. Professor of Surgery in the University of New York.

1883. Taylor, William Edwin, M.D., "Occidental Hotel," San Francisco, Cal. Professor of the Principles and Practice of Surgery in the Medical Department of the University of California, and in the Dental Department of the same University, San Francisco.

1885. Thompson, J. Ford, M. D., 1401 H Street, N. W., Washington, D.C. Professor of Surgery in the National Medical College; Surgeon to the Garfield Memorial Hospital and to the Children's Hospital.

ELECTED

1882. THOMSON, WILLIAM, M.D., 1426 Walnut Street, Philadelphia. Honorary Professor of Ophthalmology in the Jefferson Medical College Hospital, Philadelphia.

1882. TIFFANY, LOUIS MCLANE, A.M. Cantab., M.D., *Vice-President*, 831 Park Avenue, Baltimore, Md. Professor of Surgery in the University of Maryland; Surgeon to the University Hospital, Baltimore. *Member of Council*, 1885–89.

*1880. TREMAINE, WILLIAM S., M.D., 217 Franklin Street, Buffalo, N. Y. Major and Surgeon U. S. Army, Consulting Surgeon to the Buffalo Hospital of the Sisters of Charity, to St. Francis's Hospital, and to the Maternity Hospital, Buffalo.

1882. VANDER VEER, ALBERT, A.M., M.D., Ph.D., 28 Eagle Street, Albany, N. Y. Professor of Abdominal Surgery and of Clinical Surgery in the Albany Medical College; Consulting Surgeon to St. Peter's Hospital; Attending Surgeon to the Albany Hospital.

1891. WALKER, EDWARD W., M.D., 96 West Eighth Street, Cincinnati, Ohio.

1882. WARREN, JOHN COLLINS, M.D., 58 Beacon Street, Boston, Mass. Associate Professor of Surgery in Harvard University; Surgeon to the Massachusetts General Hospital, Boston. *Vice-President*, 1890.

1882. WATSON, B. A., A.M., M.D., 124 York Street, Jersey City, N. J. Surgeon to the Jersey City Charity Hospital, to St. Francis's Hospital, and to Christ's Hospital.

1839 WEEKS, STEPHEN, H., M.D., 662 Congress Street, Portland, Me. Professor of Surgery in the Medical School of Maine. *Member of Council.*

1889. WEIR, ROBERT F., 37 West Thirty-third Street, New York. Professor of Clinical Surgery in the College of Physicians and Surgeons, New York.

*1880. WEIST, JACOB ROWLAND, A.M., M.D., *Secretary*, 1880–91, 118 North Eighth Street, Richmond, Ind. Surgeon to St. Stephen's Hospital, Richmond, Indiana.

ELECTED.

1880. Wharton, Henry R., 112 S. Eighteenth Street, Philadelphia. Demonstrator of Surgery, University of Pennsylvania; Surgeon to the Presbyterian, German, and Methodist Hospitals, Philadelphia.

1882. White, J. William, M.D. PhD., 1810 South Rittenhouse Square, Philadelphia. Professor of Clinical Surgery in the University of Pennsylvania.

1891. Wight, Jarvis Sherman, M.D., 30 Schermerhorn Street, Brooklyn, N. Y.

1882. Willard, DeForest, A.M., M.D , PhD., 1818 Chestnut Street, Philadelphia. Clinical Professor of Orthopedic Surgery in the University of Pennsylvania; Surgeon to the Presbyterian Hospital; Consulting Surgeon to the White and to the Colored Cripples' Homes, Philadelphia.

*1880. Yandell, David W., M.D., 706 West Chestnut Street, Louisville, Ky. Professor of the Principles of Surgery and of Clinical Surgery in the Medical Department of the University of Louisville. *President*, 1889.

HONORARY FELLOWS.

ELECTED

1885. ANNANDALE, THOMAS, ESQ., 34 Charlotte Square, Edinburgh, Scotland. Regius Professor of Clinical Surgery in the University of Edinburgh.

1885. BILLROTH, PROF. DR. THEODOR, 11 Alser Strasse, Vienna, Austria. Professor of Surgery in the University of Vienna.

1891. BRYANT, THOMAS, 65 Grosvenor Street, Grosvenor Square, London, England.

1891. CHIENE, JOHN, 26 Charlotte Square, Edinburgh, Scotland. Professor of Surgery in the University of Edinburgh.

1885. CZERNY, PROF. DR. VINCENT, 25 Sophien Strasse, Heidelberg, Germany. Professor of Surgery in the University of Heidelberg.

1891. DURHAM, ARTHUR EDWARD, 82 Brook Street, Grosvenor Square, London, England. Senior Surgeon to Guy's Hospital, London.

1885. ERICHSEN, JOHN ERIC, LL.D., 6 Cavendish Place, Cavendish Square, London W., England. Professor of Surgery in University College (Emeritus), London.

1885. VON ESMARCH, PROF. DR. FRIEDRICH, 2 Hospitalberg, Kiel, Schleswig-Holstein. Professor of Surgery in the University of Kiel.

1891. HARRISON, REGINALD, 6 Lower Berkeley Street, London, England.

ELECTED

1890. Horsley, Victor, F.R.S., 25 Cavendish Square, London, England.

1882. Horwitz, P. J., M.D., 1919 Walnut Street, Philadelphia, Medical Director U. S. Navy (Retired), Philadelphia.

1882. Hunt, William, M.D., 1300 Spruce Street, Philadelphia, Surgeon to the Pennsylvania Hospital, Philadelphia.

1885. Lister, Sir Joseph, Bart., D.C.L., LL.D., 12 Park Crescent, London W., England. Professor of Clinical Surgery in King's College, London.

1886. MacCormac, Sir William. 13 Harley Street, London W., England.

1887. Ollier, Prof. Dr. Leopold, 3 Quai de la Charité, Lyons, France.

1885. Paget, Sir James, Bart., D.C.L., LL.D., 1 Harewood Place, Hanover Square, London W., England.

1885. Verneuil, A., M.D., 11 Boulevard du Palais, Paris, France. Professor of Clinical Surgery in the Faculty of Medicine of Paris.

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NOTICE.

THIS Volume of TRANSACTIONS contains the papers read before the Association at the meeting held May 31, June 1 and 2, 1892.

The Association assumes no responsibility for the statements and opinions published in this volume.

An Appendix to this Volume presents a complete List of Fellows, and a General Index for Vols. I.–X.

REPORT OF THE COMMITTEE ON NECROLOGY.

SILAS N. BENHAM.

Born November 20, 1840. Died November 3, 1890.

Dr. Silas N. Benham was born in Washington, Pa., November 20, 1840. He received his education in the public schools and in the Washington College (now Washington and Jefferson College), graduating from that institution in the spring of 1861. At the breaking out of the late Civil War he entered the army and served with distinction in the Army of West Virginia, with the rank of Captain, on the staff of his uncle, General Benham, U.S.A. Ill health compelled him to retire to civil life, and in the autumn of 1863 he became a student of medicine in the office of the late Dr. Julius Le Moyne, of Washington, Pa. He attended medical lectures at the University of Pennsylvania during the sessions of 1863–4 and 1864–5, and received the degree of Doctor of Medicine in March, 1865. Shortly after his graduation he located in Pittsburg, Pa., and continued in active practice in that city until one month before his death. He died November 3, 1890, death being caused by a tumor (sarcoma) of the brain.

Dr. Benham was intimately connected with the various charities of Pittsburg; was at one time physician to the Mercy Hospital; was surgeon to the Western Pennsylvania Hospital; was one of the founders of the Pittsburg Free Dispensary, and was surgeon to it for nearly twenty years. He was a member of the State and local Medical Societies, and had served as president of the county society; was a member of the American Medical Association, and was at one time secretary of its Judicial Council; was an original Fellow of the American Surgical Association, and was a member of the International Medical Congress in 1881. Dr. Benham was a skilful, conscientious, and scientific surgeon, a good citizen, and a noble-minded, generous man.

J. McC.

CHRISTOPHER JOHNSTON, M.D.

Born September 27, 1822. Died October 11, 1891.

The subject of this memoir was born in Baltimore, September 27, 1822. His tastes led him to decide upon a professional occupation, which choice his subsequent career amply justified. He graduated M.D. from the University of Maryland in 1843, continuing his studies during some years in Paris, Vienna, and Spain. After lecturing on anatomy in the Baltimore College of Dental Surgery during several sessions he was called to the Chair of Anatomy in the University of Maryland in 1864, was transferred to that of Surgery in 1869, and became Emeritus in 1881.

Dr. Johnston's preference was always toward the scientific side of professional life. He was an excellent microscopist, a skilled draughtsman, an accomplished linguist. As a surgeon he was careful and painstaking, hence conducted to a successful termination many operations. As a writer, the scientific tendency of his thought was plainly evident. His advice, sought often by his juniors, was given with kindly sympathy, a rare quality which gained him the warmest of friends.

Several times he contracted diphtheria from children upon whom he had operated for laryngeal stenosis during the course of that malady; twice during 1884 did this happen to him, and it is likely that he never thoroughly regained his health. He died in Baltimore, October 11, 1891, after several months of ill health.

HENRY FRASER CAMPBELL, M.D.

Born February 10, 1824. Died December 15, 1891.

Henry Fraser Campbell, one of the original Fellows of the American Surgical Association, was born in Savannah, Ga., February 10, 1824, and died in Augusta, Ga., December 15, 1891.

He received a fair academic education, which was supplemented with a classical course under a private teacher. At the age of fifteen he began the study of medicine under the supervision of his uncle, Paul

F. Eve, M.D., who was then Professor of Surgery in the Medical College of Georgia, and who afterward became very eminent in surgery. He graduated in the Medical College of Georgia in 1842, being then eighteen years of age. He at once established himself in the general practice of medicine in Augusta, Ga., where he remained till his death, with the exception of the time spent in the Confederate army during the late Civil War, and of two winters in New Orleans, where he had been called to fill professional chairs. While he did a general practice, especially as a consultant, he made specialties of surgery and gynecology as he advanced in life, in each of which he became distinguished.

Soon after his graduation he was appointed Demonstrator of Anatomy in the Georgia Medical College, at Augusta, a position which he ably filled for twelve years, and thus laid the foundation for the great success and distinction which he afterward attained in the profession. In 1854 he was elected to the chair of Comparative Surgical and Microscopical Anatomy in the same college. In 1866–67 he was elected to and accepted the chair of Anatomy, and in 1867–68 the chair of Surgery in the New Orleans School of Medicine, and was Clinical Lecturer in the Charity Hospital. In 1868 he accepted the chair of Operative Surgery and Gynecology in his alma mater, the (now) medical department of the University of Georgia, which position he retained till his death.

As a teacher, while he possessed no particular oratory or grace of manner, he was always ready, easy, and comprehensive. He began to contribute with his pen to the literature of the profession very early in life, and he was a voluminous writer for many years; very few who have spent their lives in a laborious practice of an exacting profession have worked in so extensive a field or discussed subjects in so many distinct departments of the profession. His contributions were in physiology, pathology, surgery, gynecology, and sanitation; and while all of his essays were very valuable and highly appreciated by the profession, that on the "Excito-secretory Function of the Nervous System" gave him a world-wide reputation as an investigator and author.

Dr. Marshall Hall, the great English neurologist, said: "It would be unjust to deny that Dr. Campbell has the merit of having called attention to the excito-secretory system of nerves in 1850, and that he imposed this very designation in 1853. So far, Dr. Campbell's claims are undeniable, and I would say 'Palmam qui meruit ferat.'"

During the Civil War Dr. Campbell was commissioned as a Surgeon of the Confederate army, and acted as Medical Director and Consulting Surgeon of the Georgia Military Hospital in Richmond. He was also a member of the Examining (Medical) Board. He continued his connection with the Southern army until the end of the war. During his army service he found time to contribute largely to the *Manual of Military Surgery*, prepared for the use of the Southern army.

Dr. Campbell was a member of the American Medical Association. He was Vice-President in 1858, and President in 1871, of that Association.

He was a corresponding member of the Academy of Sciences of Philadelphia; a corresponding member of the Academy of St. Petersburg, Russia; a member of the Medical Society of Sweden; member of the Medical Association of Georgia, its Vice-President in 1852, and President in 1871. He was a Fellow and one of the founders of the American Society of Gynecology, and one of the original Fellows of the American Surgical Association.

Dr. Campbell was a great student, a painstaking investigator, a close observer, and a most wise and philosophic surgeon. He was a pure and sincere Christian, a most excellent citizen, and an honest man.

W. T. B.

ROBERT ALEXANDER KINLOCH, M.D.

Born February 20, 1826. Died December 23, 1891.

Dr. Robert Alexander Kinloch was born in the city of Charleston, South Carolina, on the 20th day of February, 1826. He was educated at the College of Charleston, South Carolina, from which institution he was graduated with distinction in 1845. Immediately after leaving college he began the study of medicine in the Medical College of the State of South Carolina, and attended one course of lectures there, after which he came to Philadelphia and entered the University of Pennsylvania, from which he received the degree in medicine at the commencement exercises of 1848. Subsequently he went abroad and attended lectures and hospital service in London, Paris, and Edinburgh. After two years' residence in Europe he then returned to America and commenced the practice of his profession in the city of his birth.

At the outbreak of the Civil War he entered the military service with the rank of Surgeon, and served with great distinction to its close, as Medical Director on the staffs of Generals Lee, Pemberton, and Beauregard. His last position was that of General Medical Inspector of Hospitals.

After the close of the war he returned to Charleston and resumed the practice of his profession. In 1867 he was elected Professor of Materia Medica and Therapeutics in the Medical College of the State of South Carolina, and a short time afterward he was transferred to the chair of Surgery in the same institution, which position he held at the time of his death. He was, for a long time, Surgeon to St. Xavier's Infirmary; to the Roper and City Hospitals of Charleston; a member, and at one time the president, of the Medical Society of South Carolina; President of the Medical Association of South Carolina; an Associate Fellow of the College of Physicians of Philadelphia; and a delegate from his State Association to the International Medical Congress of 1876. He was the first Vice-President of the American Medical Association in 1883; and a delegate from this Association to the Berlin Congress of 1890.

His connection with this Association is of especial interest, as he was one of its original Fellows, and from its first to its last session he proved himself an active and energetic worker in its behalf.

As editor of the *Charleston Medical Journal* he did much work, and his contributions to surgical literature are to be found scattered through its pages as well as others of the medical press. Although not what might be termed an extensive writer, his articles were sound and practical. He was by far the most prominent surgeon in his section of the South, and some of his operations were unique. He was the first surgeon in America who successfully made a resection of the knee-joint for chronic disease of that joint; the first to treat fracture of the lower jaw by wiring the fragments; and to him belongs the honor of being the first surgeon who ever performed laparotomy for a gunshot wound of the abdomen without protrusion of the viscera.

It was, however, in his private and his social relations that the character of the man was most marked, and the universal esteem in which he was held by the community in which he resided from his birth to his death attests his worth. Apparently of a cold and reserved nature, he was yet the most genial of men, and those who knew him

best found in his bosom as warm and kindly a heart as ever beat responsive in sympathy for his fellow men.

Although not unexpected—for he had been dangerously ill for several days—on the 23d of December, 1891, when the news went forth that Robert A. Kinloch was dead, all Charleston mourned. His loss was felt to be a sad and irreparable one to the community in which he had resided, and the entire South knew that one of her best citizens, one of her truest men, had passed away.

He is a loss to this Association, and those who enjoyed his friendship will long remember him as the skilful surgeon, the chivalric gentleman, the true, tried, and trusted friend. C. H. M.

WASHINGTON FREEMAN PECK, M.D.

Born January 22, 1841. Died December 30, 1891.

Dr. Washington Freeman Peck was born January 22, 1841, in the town of Galen, Wayne County, New York. After receiving a good common-school education he entered, in 1859, Bellevue Hospital Medical College as a student, and graduated in 1863. Having received the degree in medicine, he was appointed medical officer in the United States Volunteer Service, and continued in this service until the termination of the Civil War, when he took up his residence in Davenport, Iowa. In 1868 he was elected Professor of Surgery and later of Clinical Surgery in the Medical Department of the University of Iowa, and retained this position until a short time before his death.

Dr. Peck was elected a Fellow of the American Surgical Association in 1883, and in 1889 was chosen a member of the Council. He was also a member of the American Medical Association, and of the County and State Medical Associations of his county and State.

Dr. Peck was widely known in the community in which he lived, and devoted much time and attention to the charitable institutions of the city. A large professional practice attested his success as a practitioner of medicine, and he possessed in a notable manner the confidence and regard of his patients.

D. HAYES AGNEW, M.D.

Born November 21, 1818. Died March 22, 1892.

David Hayes Agnew, than whom no member of the American Surgical Association was better known or more universally loved by his colleagues, was born in Lancaster County, Pa., on the 21st of November, 1818, and was therefore seventy-three years and four months old at the time of his death, which occurred on March 22, 1892. His early education was obtained at a well-known academy of the period, in Chester County; at Jefferson College, Canonsburg, Pa.; and at Delaware College, Newark, Del.; while his professional training was received from the University of Pennsylvania, which bestowed upon him the degree of Doctor of Medicine on April 6, 1838.

After practising for several years in Lancaster and Chester Counties, and after an unsuccessful experience in the iron business, Dr. Agnew, in 1853, became a citizen of Philadelphia, and then began that long career as surgeon, teacher, and author, which brought him to the eminent position which he ultimately came to occupy. Always devoted to the study of practical anatomy, Dr. Agnew, in the year following his change of residence, took charge of the old Philadelphia School of Anatomy, situated in the rear of the University buildings, and there taught his favorite subject, with special reference to its surgical relations, to large classes of students, by whom he was quickly recognized as a clear and most instructive lecturer. In 1863 he was appointed Demonstrator of Anatomy in the University of Pennsylvania, and in 1870 was made Professor of Clinical and Operative Surgery, succeeding to the full chair of surgery in the following year. Dr. Agnew resigned his University positions in 1889, when he was unanimously elected Emeritus Professor of Surgery and Honorary Professor of Clinical Surgery by the Trustees.

Dr. Agnew devoted much time to hospital practice, serving first in the wards of the Philadelphia Hospital, and afterward for many years in the Pennsylvania Hospital and the University Hospital, and being connected at different times with the Wills Eye Hospital, the Orthopædic Hospital, the Presbyterian Hospital, and, during the late

war, with the Mower U. S. A. General Hospital at Chestnut Hill, where many thousands of wounded men came under his observation.

Besides his hospital work, Dr. Agnew conducted a large private practice, and it is probable that during his later years he saw more patients in his office and in consultation than any other Philadelphia surgeon. His advice was eagerly sought by patients in all classes of the community, and his aid was constantly invoked, and always highly valued, by his fellow-practitioners.

As an author, Dr. Agnew's fame will mainly rest upon his well-known *Principles and Practice of Surgery*, an elaborate work in three very large volumes, which will always be consulted by surgical investigators as containing the record of its writer's immense personal experience.

The high esteem in which Prof. Agnew was held by his professional brethren may be inferred from the exalted positions which they called him to occupy. He had been President of both his County and his State Medical Society, of the Philadelphia Academy of Surgery, of the College of Physicians of Philadelphia, and, in 1887, of the American Surgical Association; and on the completion of his fiftieth year in the profession, the physicians of Philadelphia and its vicinity celebrated his "jubilee" by a public entertainment which amply testified to the universal love and veneration with which he was regarded.

A great teacher, an illustrious writer, a skilful operator, a sound and judicious practitioner, a man of unfailing courtesy and amiability, an upright citizen, and a sincere and humble Christian, the name of Agnew will long survive, writ large on the honor-roll of American surgeons. J. A., Jr.

TOBIAS GIBSON RICHARDSON, M.D.

Born January 3, 1827. Died May 26, 1892.

Dr. Tobias Gibson Richardson was born at Lexington, Kentucky, January 3, 1827. In 1837 he removed with his parents to Louisville, and in 1845 he matriculated in the Medical Department of the University of Louisville as a student, at the same time entering the office

of Professor S. D. Gross as a private pupil. While in college he was appointed resident student in the Marine Hospital at Louisville. On his graduation in medicine in 1848 he was appointed by the Faculty Demonstrator of Anatomy in the University, which position he occupied for a period of eight years.

Resigning the position of Demonstrator, he was invited to take the chair of Anatomy in the New York Medical College, and also that of Surgery in the Kentucky School of Medicine. These positions he declined, to accept the chair of Anatomy in the Pennsylvania Medical College at Philadelphia. In 1858 he was elected Professor of Anatomy in the University of Louisiana, and removed to New Orleans in the latter part of that year. In 1872 he was transferred to the chair of Surgery left vacant by the resignation of Dr. Warren Stone. This position he held until a few years before his death, resigning it on account of impaired health.

Dr. Richardson's contributions to medical literature were numerous and varied. Whilst Demonstrator of Anatomy he published, in 1853, a work entitled *Elements of Human Anatomy*, which was largely used as a text-book for medical students. In 1855 he founded, in connection with Professor S. D. Gross, the *Louisville Medical Review*, and on his removal to Philadelphia he was associated with Professor Gross in the establishment of the *North American Medico-Chirurgical Review*. Beside contributions made as editor to these journals, he made others to different medical periodicals of the country. He was the biographer of Professor John D. Godman, the distinguished anatomist and naturalist.

He was one of the original Fellows of the American Surgical Association, and was elected in 1885 one of its Vice-Presidents; a member of the American Medical Association, he was chosen its President in 1877; member of local and State societies, he was also Associate Fellow of the College of Physicians of Philadelphia and of the Academy of Surgery of Philadelphia.

Dr. Richardson's culture was broadened by extensive travel in which he indulged with great pleasure and earnestness, and which included extended journeys over North and South America, as well as on the continent of Europe.

A consistent and earnest member of the Presbyterian Church, Dr. Richardson was prominent in its councils and organizations, both local and national.

During the Civil War he entered the Confederate service as medical officer, retiring at its termination with the rank of Medical Inspector and Director-General.

The record of Dr. Richardson's life is that of an earnest worker in his chosen profession; conscientious, in the strictest sense, in the performance of every duty imposed by it upon him; a true friend; a devoted husband; a courteous, Christian gentleman. It may be truly said of him, after life's labors ended, "Well done, good and faithful servant."

J. E. M.

ADDRESS OF THE PRESIDENT.

By PHINEAS S. CONNER, M.D.
CINCINNATI, OHIO.

Fellows of the Surgical Association: After a series of meetings at the National Capital it is fitting that our first journeying should bring us to a city with which is associated so much that is good and great in the history of our country—political, literary, scientific, and professional. Here, as a part of the University that, like Salernum of old, is *mater et caput* of the schools, was established the third medical school in the Western Hemisphere, where for more than a century scientific medicine has been well and thoroughly taught. The Massachusetts General and City Hospitals have been the theatres of much work that has strongly affected the practice of our art the world over, and one of them will ever be remembered as the place in which "the problem of surgical anæsthesia was definitively solved." Their surgeons, learned, skilful, progressive, and inventive, by labors and teachings have honored themselves and the profession of which they have been such distinguished members. Not in America only, but everywhere, the profession has held and now holds in high esteem the medicine and surgery of Boston.

The active life of the Surgical Association, that began with the meeting at Philadelphia, embraces a ten-year period than which no other in professional history has been more strongly characterized by extent and accuracy of investigation, by scientific judicious experimentation, by the discovery of important facts, by improvements in the technique of old operations, and by the introduction and general adoption of new procedures. In the

study of the causes of diseases many master minds have been at work, and more positive knowledge has been gained than in all time before; in the bacteriological laboratories a new pathology has been worked out, in large measure revolutionary of both opinion and practice. Speculation and theory have given place to experimentation and fact, and the disease-producing influences of airs, of earths, of waters, have been found to lie in organisms that have been seized upon, separated, classified, and tested.

We can scarcely realize that it was only in 1882 that the startling announcement was made that tuberculosis was consequent upon the presence and action of a definite microörganism that could be isolated, cultivated, and inoculated; and that so short a time ago the doubters were many, more, indeed, than the believers. In this single decade just passed the fact has become universally acknowledged; the skeptics are now but professional curiosities; a new literature has been written; even a new language created, in which strumous (except as a synonym of tuberculous) has no more place than phlogiston.

The long-known chronic affections of bones, of joints, of glands, of skin, have been shown to be in great measure the result of the presence and action of a bacillus that everywhere, and under all circumstances, moves in one and the same way, and that a destructive one; though antagonized at every step by the healthy tissues (not seldom successfully) and subject more or less completely to the power of our art, directed to the procuring of the destruction or encapsulation of the germ, the removal of the infected tissue, or the taking away of the affected part. We can understand now why rest is of so much importance; why excision or erasion may be followed, as it so often is, by non-recurrence; why, on the other hand, in spite of or even because of operative interference, parts near or more remote become secondarily infected.

The most important work, as it seems to me, that has been done in connection with surgical tuberculosis is that which has had for its object the finding out and properly applying a therapeutic agent which will destroy the organism and secure

its expulsion from the body, or secure such condensation of non-infected tissue about it as shall form a wall around, and by encapsulation render it harmless. Far better will it be to administer generally or locally a remedy that will remove the bacillus or make it innocuous than to do the most brilliant operation, followed by the most rapid healing and recovery in large measure of functional integrity. The end is far from having been reached, but a long step in advance has been made, and the reviewer of the work of another ten years may find the result secured, and a non-operative, truly curative treatment in use. It is certainly to be hoped, though, that scientific Medicine will not again have to pass through such an experience as that of a couple of years or less ago, the history of which will always be of much interest to the students of psychology and of mental epidemics.

Of the three wound complications which from earliest times have been the bane of surgery—septic infection, erysipelas and tetanus—the cause of only the first had been determined a decade ago; that of each is now known, and known because of the application to the tissues and fluids of those affected by them of the same methods of bacteriological investigation that had revealed the existence and life-history of the pyogenic cocci. In erysipelas have been satisfied the three requirements of proof of bacterial origin—isolation, cultivation, and inoculation into the human subject with resulting development of the original disease. Not a few of the long-time perplexing questions connected with tetanus have found answer in the discovered identity of its causative organism with the earth-bacillus and in the anaerobic nature of it. In every case that has come under my observation, so far as I can now recall, except those associated with toy pistol wounds, I am able either to trace direct contact with the naked ground or probable almost unavoidable contamination of the wound with dust and dirt. In the toy pistol wounds of the hand there was that exclusion of air and retention of fluid that are most favorable to the growth and activity of secretion of an organism that flourishes in the absence of oxygen, an organism that at the time of injury or later

was located, doubtless, upon the dirty hand. Knowledge of the habits of the bacillus is sufficient of itself to indicate the treatment to be pursued that tetanus may not supervene, to-wit, thorough opening up and free drainage of the wound. Further, not only has the causative organism been found, but also it has been shown that there may be developed from it an antidotal chemical agent, the injection of which can produce immunity or act remedially upon a tetanic patient.

It is in the treatment of the diseases and injuries of the viscera and their envelopes that the greatest advances in our art have been made in these later years. Numerous and carefully-conducted experiments upon animals and operative procedures upon man, new, bold and highly successful, have again and again been reported; and in the work that has been done our own Fellows have had no minor part.

The abdominal cavity, that for so long a time was an almost sacred territory, not to be invaded except under peculiar circumstances and for the relief of a very few morbid conditions, has, because of secured protection against sepsis, become one of the more common fields of operation, done on account of wounds, of tumors, of obstructions, and of infective inflammation. Such operations not seldom have been, it may be believed, ill-advised, ill-timed, unnecessary, and harmful, entered upon by inexperienced men, whose eagerness to cut has found explanation in the fact that in simple abdominal section few operative difficulties are usually met with, and no dangerous hemorrhage is to be expected the arresting of which might test the knowledge and skill of the operator.

Penetrating and perforating gunshot wounds of the hollow and solid viscera are no longer treated solely by opium and ice, with a resulting fatality truly appalling, but by section of the wall, suture of the wounds, ligation of the bleeding vessels, and antiseptic plugging, if necessary, of openings in the solid organs. The mortality rate is still unfortunately very high; how high cannot be definitely stated, since the number of reported cases is yet limited, and includes without doubt an undue proportion of successful results. Not a few of the deaths, it cannot be

doubted, have been due to the delay, the incompleteness, and the imperfection of the operation; but many must be credited to the damage primarily done. Made by bullets other than of the smallest calibre, a pistol wound of the stomach, of the intestines, of the mesentery, or of the liver, is likely to prove mortal from shock or hemorrhage, even though treated properly and skilfully; and is almost absolutely certain to do so if fecal extravasation has occurred and septic inflammation has set in. It cannot be questioned but that wounds made by very small balls may be and have been recovered from without operative interference, and there is good reason for believing that in the absence of symptoms of active hemorrhage such wounds will do as well or better without as with laparotomy, an operation which, however improved its technique, is still an addition to the risks of the case. It is as unwise as it is untrue to declare that there are no dangers attaching to incision of the abdominal wall and exploration of the intestinal tract. But when it is a bullet of larger size that has entered the cavity the safety of the patient almost certainly lies, if anywhere, in speedy thorough operation. It is hard to understand such statistics as those of Reclus, in which it would appear that while without operation only 25 per cent. died, with operation the mortality rate was from 73 to 86 per cent. That in three out of four, or six out of seven patients thus wounded the result was a fatal one may be believed, but that it should be so in only one out of four expectantly treated is, to say the least, very remarkable. Not the smallest of difficulties often associated with these wounds is the determination of the occurrence of penetration, which at times can only be through free opening up and following down of the parietal wound. Inflation of the bowels with hydrogen gas, the earlier experiments with which were so brilliant and so captivating, will not always give the desired information, and may be positively detrimental to the best interests of the patient, as it certainly has been in certain cases already put on record.

The septic inflammations about the head of the colon, originating so generally in the appendix (which some would regard

as an "intestinal tonsil," but which may well be looked upon as a useless survival of a once important organ) have in the period under consideration been brought within the province of the surgeon, not as before at a late day, when the resulting abscess has fortunately come well forward toward the surface, but at an early stage when by evacuation of the fluid, with or without removal of the appendix, relief may be afforded and the patient protected against the lethal effect of perforative peritonitis or perinephritic suppuration. The cases of acute disturbance in the region of the cecum, due to an overloaded bowel or catarrhal inflammation, will find relief in the future as in the past in the therapeutic measures of the physician ; but suppurative gangrene-producing appendicitis it has been proven, and that chiefly by the experience of our American surgeons, can with safety be treated only by the knife. Whether or not it is advisable to remove during a quiescent stage the appendix that has been the seat of repeated attacks of inflammation is a question as yet unsettled.

A very cursory examination of the professional literature, home and foreign, of the past decade, would convince anyone that an immense amount of work, experimental and operative, has been done in the determination of the proper and most advisable methods of treatment in cases of obstruction, acute and chronic, malignant and non-malignant, located in any part of the tract from the cardiac extremity of the stomach to the lower end of the rectum. Strictures have been dilated, affected areas removed, anastomoses secured, "cut-offs" established, new openings formed, with the result in favorable cases of effecting cure or affording relief. The technique of the older operations has been much improved, modifications have been introduced, and not a few altogether new procedures have been devised, tested and widely accepted.

Pyloric stenosis, for which ten years ago pylorectomy was all that the surgeon could offer, may now, if of non-malignant character, be relieved by digital divulsion through the opened stomach, by curetting, by a pyloro-plastic operation or by gastro-enterostomy; and if due to malignant disease by the latter operation, in every way to be preferred to excision of the cancerous mass,

being speedier and easier of execution and having a mortality rate but one-half or perhaps only one-fourth as great. In its performance, as in similar operations upon lower portions of the intestines, much use has been made of approximation-plates, as of decalcified bone, of leather or of potato, and of catgut rings and mats; but at the present time there is certainly a strong and growing feeling that their employment is not only not necessary, but rather an injury than a benefit to the patient. It may well be questioned, if, after all, viewing the subject in its widest aspect, operations for cancer of the stomach have really been or can be of much service. They certainly have often afforded much temporary relief, and are to be resorted to when suffering is great and starvation is imminent; but on the other hand, the prolongation of life when the operation is recovered from is, with only now and then an exception, but slight. Excision has almost never protected from recurrence, the abnormal anastomoses are very likely to speedily become seriously contracted, with resulting loss of the benefit primarily secured, and the necessitating disease must go on increasing, though it may be more slowly than before. In not a few of the reported cases the condition of the patients at the time of operation was fairly good, the suffering but slight, and the general strength but little impaired; yet, as the direct result of the surgical interference, life was cut short. If we balance these cases against those in which a few weeks or months were gained by excision or anastomosis, it is very questionable if we can find in the result of operation any material addition to the sum total of life.

Malignant disease located in the rectum too low to be removed through an anterior abdominal incision and too high to be thoroughly extirpated through a perineal one, may be reached from behind, after resection of the coccyx, with or without, as necessity may require, that of the lower portion of the sacrum. This new operation, neither specially difficult nor dangerous, may be done in place of a colotomy lumbar or inguinal, the latter being to-day more generally preferred. The same objection to such radical treatment as compared with palliative, viz., increase of risk without compensating probability

of cure, holds good here as at the pylorus, though in less degree.

In no other part of intestinal surgery has more been done in thought, experiment, and practice than in that dealing with excisions of the bowel in continuity, rendered necessary on account of wounds, growths, or gangrene. As the technique of the operations has been improved the time of performance has been lessened, the risk to life diminished, and the range of applicability increased. It is still undetermined whether end to end, or lateral anastomosis, is to be preferred; of how much value bone plates, or rings, or other like aids really are, to the patient at least; how far omental grafts may be required, or how much additional security they afford.

The solid organs have again and again been brought under surgical treatment on account of wounds, of growths, and of tubercular, parasitic and suppurative diseases. The kidney and spleen, and even the pancreas, have been removed entire, the liver in part. The gall bladder has been opened and its contents removed (stones, bile, pus), and later sutured and left in place or stitched to the abdominal wall or cut away altogether. Pancreatic cysts have been at times extirpated, at times drained. These operations have yearly been more frequently performed, for more varied causes, by steadily improving methods, and with a marked diminution in the resulting fatality.

Special notice cannot be taken of the new and improved operations upon the uterus and its appendages, which have had for their object the relief of distressing and of grave conditions, and, as their result, preservation of life and restoration to health in large and steadily increasing proportion of the cases treated.

Of the work done upon the bladder much might well be said; but only a passing reference can be made to the high esteem in which, so justly, the supra-pubic section is now held; to the greatly improved and more successful treatment of tumors; and to the established position that in the period under consideration litholapaxy has taken as the most generally applicable method of dealing with stone, even in young children, for

the relief of whom ten years ago lithotomy was everywhere regarded as the only operation to be ordinarily thought of.

Though there have been many operations of very considerable extent upon the thoracic wall, to secure closure of an empyemic cavity and for the extirpation of tumors, in intra-thoracic surgery but little has been done, and that almost entirely in the evacuation of lung abscesses and the removal of hydatid cysts, the results in the latter class of cases having been remarkably successful. Pneumonotomy for tubercular abscess, according to the report made to the French Congress of Tuberculosis last year, had relieved in about 50 per cent. of cases, and cured in about one-fourth as many; but the number of patients thus far treated has been so small that the figures are of little importance in any consideration of the advisability or otherwise of active interference. It certainly stands to reason that the opening up and draining of the pulmonary tubercular abscess will not be likely to afford other than temporary relief, such pus collection being commonly not solitary, but one of a number in an extensively diseased organ. In the removal of deeply located foreign bodies and tumors other than those connected with the wall, almost nothing has been attempted; and there are difficulties, anatomical and physiological, in the way of such operations which, if in any given case not insuperable, will probably always tend to make the prudent surgeon cautious about entering upon one of them.

Pneumonectomy, experimentally shown to be readily done and attended with no great amount of danger, will doubtless in the future have a place in the treatment of lung injuries, in which already it has been but a few times employed, according to one report in 15 cases, with a death rate of less than 15 per cent. That it will ever be an accepted method of treating the tuberculous lung may well be questioned.

It is in the surgery of the head and spine that the greatest advances have been made, the larger number of new procedures introduced, the most brilliant operations done; and in these regions more than anywhere else the surgery of to-day is a new surgery, much of it the growth of even fewer years than those

included in the lifetime of the Association. More and more constantly are all depressed fractures of the skull being treated actively, and basal fractures antiseptically. Stronger and stronger is becoming the conviction of surgeons that fractures of the spine associated with evidences of pressure upon or injury of the cord should not be left to Nature, if the general and local symptoms indicate lesions that can be removed or relieved by elevation or extraction of vertebral fragments or the lessening of intradural tension through opening of the sheath.

It has been proven to be wise to treat bullet wounds of the brain like other punctured wounds of the organ, by exploring, cleaning and draining the tract, and occasionally it has been found possible to extract the ball through the wound of entrance or a counter opening in the skull. The future must determine how far it is wise to go in the way of effecting removal of a bullet, and this must largely depend upon a previously ascertained extent of liability to the supervention of epilepsy and mental disturbances weeks, months, or years after the lodgment of a ball that at the time of injury did but comparatively little damage, or damage at least that was spontaneously recovered from.

Trephining for epilepsy following injury of the skull is no new operation; but of late such treatment has been quite largely employed, not only in cases in which there has been an old fracture or contusion, but in those in which by application of the now well-established rules of cerebral localization it has been possible to determine the place of a meningeal thickening or a limited chronic encephalitis or a new growth, solid or cystic, acting as an exciting cause of motor disturbance. Electrical stimulation of the exposed cortex has been made to indicate with exactness a diseased area the removal of which has been followed by relief, temporary or permanent, of the spasm-symptoms. The attained perfection of the operative procedures has reduced the mortality rate to a very low figure, and even the after-presence of a gap in the skull has been prevented by reimplantation of the removed bone. Unfortunately in very many cases of recovery from the operation, in a few weeks or months, or it may be years, the convulsive seizures will come on

again. An established "epileptic habit" is independent of the original lesion, and after a certain time, which is a very uncertain one, the patient can no longer be assured that the cause removed the effect will cease. But for all this, the morbid condition is so disabling, the relief afforded may be so great, the risk run is comparatively so small, that after proper and properly continued yet unavailing medicinal treatment, an epileptic in whom the seat of the disease can be fairly well located should become the subject of operative interference.

Trephining has also been done because of the existence of long-standing severe headache; and in cases in which the thorough application of the therapeutic test has proved that the cephalalgia does not depend upon a cause that can be reached and removed by drugs the operation may certainly with propriety be recommended.

Considerable sections of the skull have been taken away to permit of expansion of the microcephalic brain; but, though improvement in mental condition in certain cases has followed such linear craniotomy, at the present time the operation seems to be of very questionable utility. Before it is to be accepted as an advisable method of treating feeble-minded children further investigation must be made into the causes of arrested cerebral development, and how far it is productive of and how far consequent upon premature ossification of the cranium.

Insanity of traumatic origin has in a very large proportion of the few cases surgically treated been much improved or cured, because, we may believe, of relief of "intra-cranial fluid pressure;" and even general paretics have been thought to have been benefited by trephining.

A few years ago who would have dreamed of opening up the lateral sinus and removing from it a pyogenic thrombus? Yet it has now been done several times and with success.

In not a few cases intracranial abscesses have been definitely located and operatively relieved.

But the most brilliant chapter in the history of brain surgery in recent times is that relating to tumors. There is set forth in it not only what has been done, remarkable as it is, but also the

unity of medicine and the interdependence of its various departments. It is because of the work of the anatomist, the physiologist, the pathologist, the neurologist, that it has been rendered possible to locate with close approximation to exactness the position of the neoplasm and its character, without knowledge of which the skill of the surgeon and the most careful operative technique would be of little or no avail. Even the experimental therapeutist has played a part, because of his demonstration of the influence of morphia upon the intracranial circulation. Though in but a small percentage of cases of tumor has it been or perhaps can it be practicable to effect removal, because of location or pathological character, yet when it is so the gain is enormous, even though the relief afforded be but temporary, as in dealing with certain growths it must be.

Much less operative work has been done upon the spine than upon the head. It has had for its object the evacuation of abscesses, the relief of paralysis, and the removal of tumors pressing upon the cord, and has been in a high degree satisfactory and full of promise.

As never before, the congenital malformations, meningocele, encephalocele and spina bifida, have been subjected to surgical treatment and that with an increasing success as improvements have been made in the methods of execution. Renewed attempts have been made to permanently get rid of intra-ventricular effusions by tapping and drainage, but the results have not been what might be desired, and that whether the old route to the ventricle has been followed or the new lateral one.

In the special departments, as in general surgery, these last ten years have been busy ones; and each may justly claim that there has been advance made in the recognition of disease and improvement in its treatment. But consideration of the work done in them does not concern us here.

Any retrospect, be it never so hurried, of the work of the decade furnishes good warrant for pride in what has been and high hopes of what is to be. The world over, educated minds and trained hands are busy with the problems of cause, of course, of termination, and are seeking out surer, safer, and speedier means of relief, therapeutic and operative. Week by week and

month by month what is accomplished becomes free and common property; everything is proven and the good held fast. What will be the outcome of all this thinking and experimenting and operating and writing, even in the near future, who would dare to predict? American surgeons have had not a little to do with the work in the past; Fellows of our own Association, "some of whom have fallen asleep," have been closely identified with the discovery, the early adoption, and the thorough testing of not a few of the new methods of treatment; and we may expect with confidence that it will be with us hereafter as it has been, and yet more.

As an organized body, certain duties rest upon the Association. Representing the surgery of a country of wide extent and of very varied climate and soil, of a people of many racial origins, there should be conducted by it a series of collective investigations, which, for example, might show the prevalence and, as far as possible, the more remote determining causes of certain surgical diseases, chief among which is cancer; or the influence of the local conditions, as of altitude, of average temperature, and of moisture upon the healing of wounds; or of the relative resistance power to the action of morbific organisms of the descendants of immigrants from different nations, still more of members of the several color-races, four of which are to be met with within our boundary lines in numbers large enough to be of value in an investigation of this sort. From our meetings year by year should go out to the world reports, as it were, of the surgical state of the nation, and, as far as can be ascertained, the reasons therefor as found in place, in race, in occupation and in social position.

In the *personnel* of the Association the years that have gone by have wrought much change. It could not but be so. Thirty-four of the Fellows have passed away, leaving to us a memory of worth, of learning, and of skill. Since our last meeting Agnew and Campbell and Johnson and Kinloch and Peck and Richardson (T. G.), have rested from their labors. Each, honorable and honored, in his own place and in his own way, aided Humanity and advanced Medicine, and each will long be held by us in kind remembrance.

TREATMENT OF FRACTURES OF THE LOWER END OF THE HUMERUS AND BASE OF THE RADIUS.

By JOHN B. ROBERTS, A.M., M.D.,

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As a preliminary to the discussion of the topics which have been assigned me by the Committee on Business it is proper to state that there will be found in my paper no new ideas, no new anatomical or pathological facts. It simply gives my personal views on certain problems in clinical surgery.

The frequency of fractures at the lower end of the humerus and at the base of the radius, and the necessity of maintaining functional integrity of the joints of the upper extremity, make the consideration of such injuries of primary importance. The desirability of an accepted and usually practised method of treatment for these fractures will be unquestioned; while the value of establishing such rules of practice is fully recognized by all interested in surgical jurisprudence.

The great diversity of opinion exhibited by the members of this Association last year, when the subject of elbow injuries was introduced by Dr. L. A. Stimson, was a revelation to me. I had, up to that time, believed that my own views, derived from the study of surgical literature and clinical cases, were not very different from those of other surgeons. Hence, I was somewhat unprepared for the remarks of many of the speakers on that occasion.

A pretty thorough examination of the text-books in the hands of the practitioners and students of this country and an investigation of some of the writings of foreign surgeons have

led me to believe that much bad surgery is taught and practised. This state of affairs must be due to ignorance of recent advances in surgical pathology or to an indisposition to accept statements and methods of treatment which appear to me to appeal very strongly to surgical experience and intelligence. As an illustration, I quote from a recent work of M. Armand Després, published in 1890. The author, in speaking of fractures at the lower end of the radius, says:[1] "I am of Nélaton's opinion that the reduction is not necessary; the apparatus when well applied reduces the fracture by degrees and without pain." He, moreover, does not apply the splints until from twenty-four to thirty-six hours after the injury, but uses up to that time warm fomentations or cataplasms. Such a method of treatment seems to me so totally opposed to surgical principles and the advice of such a dangerous character to give students that any discussion which will neutralize the effect of this author's words cannot be without value.

Again, I find in Dr. Henry R. Wharton's valuable treatise on *Minor Surgery and Bandaging*, published in 1891,[2] the direction given that, before applying any splint in fractures of the lower end of the humerus, "it is well in many cases to apply over the region of the fracture several folds of lint saturated with lead-water and laudanum, and to cover this dressing with wax-paper or rubber tissue, to diminish as far as possible the swelling, which is very marked after these injuries." My own belief is very strong that such dressing is not only useless but harmful; because the application of these poultices over the injured limb often gives rise to the occurrence of cutaneous vesication in the inflamed region. Evaporation of the lotion is prevented by the rubber tissue or wax-paper, and the encouragement of serous exudate beneath the cuticle is not infrequently followed by large blebs. Such applications are never required in fractures, since the swelling and œdema, due to the aseptic traumatic inflammation, rapidly subside if the fragments are properly adjusted and kept at rest. I have a continual struggle with young hospital

[1] Treatise on Fractures, translated by Dr. E. P. Hurd, p. 4.
[2] P. 325.

residents to prevent their following this pernicious advice, which appears to be taught by more than one lecturer. In cases where the swelling and œdema will not subside by coaptation of the fragments and rest, more active surgical interference than applications of lead-water and laudanum is required.

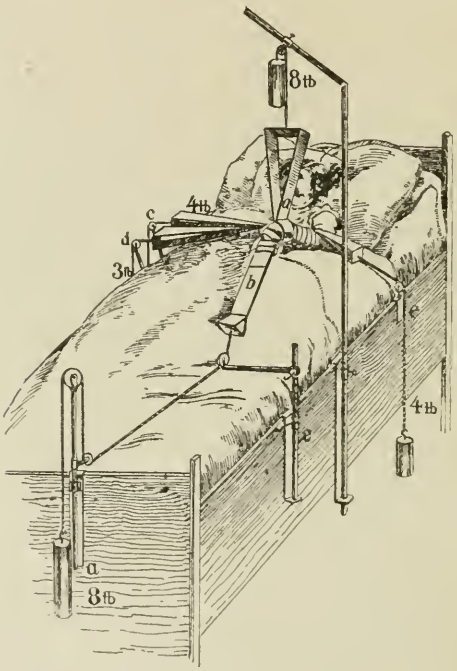
The unfortunate tendency to use complicated fracture dressings, which obtained in the early history of surgery, still remains to be overthrown by the continued advocacy of mechanical simplicity. Most of these appliances appear to have been invented by those more interested in the construction of machinery than in a simple solution of the mechanical problems presented by osseous injuries. The application of these complicated dressings is nearly always expensive and uncomfortable to the patient, confusing to the average practitioner, and unintelligible to the student. Their use, moreover, tends to direct the attention of the surgeon to the kind of apparatus rather than to the conditions presented by the special injury under his care. No better illustration of this tendency to devise unnecessary appliances for fractures is needed than this drawing of an apparatus of Prof. Bardenheuer for fractures of the lower end of the radius. You see the patient confined to bed, on the framework of which are fastened six pulleys, through which five cords with weights make traction on as many different parts of the arm and hand. You will be surprised, perhaps, when I tell you that this device of the Inquisition is described in his book published in Stuttgart in 1890.[1] The other splints and dressings represented and advocated by this writer in like manner strike the practical surgeon with amazement. If it were not for the indisputable evidence of the title-page, the book might be regarded as the work of a mediæval author. Think of a man with fracture of the lower end of the radius, which usually needs no splint and often need not keep him from business for one hour, being confined to bed with five weights pulling on his unhappy arm.

These considerations make me believe that a discussion by this representative body of the treatment of some of the common

[1] Leitfaden der Behandlung von Fracturen und Luxationen, p. 96.

fractures of the upper limb will not be valueless. Simplicity in dressings, comfort to the patient, and very early restoration of function are the demands made by the public when fractures require treatment. I believe these demands can and will be met in nearly all fractures, if surgeons will but use their intelligence, instead of blindly following the advocates of special splints; and if systematic authors will resist the temptation of describing and cataloguing every device that has been employed for these lesions.

FIG. 1.



Fractura radii loco-classico.

Durch *a* wird das untere Ende des Vorderarms dorsalwärts geleitet, durch *c* wird das obere Ende des Vorderarms fixirt, durch *b* wird die Hand und das untere Fragment volarwärts geleitet.

Believing that the methods which I have been led to adopt are founded upon good anatomical and pathological reasoning, I cannot but think that a trial of the simple dressings proposed

in this paper will lead to a recognition of their value. I venture to hope that their adoption by surgeons generally will change the opinion, apparently existing in many minds, that good results after fractures at the elbow and wrist are rather the exception. I adhere strongly to the statement which I made at last year's meeting—that I approach ordinary fractures at the lower end of the humerus and of the base of the radius with a feeling that I shall almost certainly obtain results satisfactory to myself as well as to the patient.

It is proper to explain what is meant here by the term "uncomplicated" fractures, since a proper understanding of the word as used in this communication is essential to the subsequent discussion. I mean fractures in which there is no dislocation of the joint, no rupture of large vessels, no laceration of the nerve trunks and no unusual contusion or laceration of surrounding tissues. In many of the cases which I am considering there is involvement of the adjacent joint by lines of fracture, splitting the lower fragment. I consider these cases uncomplicated if the fractures are closed ones and if the comminution of the lower fragments is not extraordinarily great. I am aware that this involvement of the joint by fissure is technically a complication; but it is so common in the fractures which I desire to bring before you, and so important so long as the injury is free from septic contamination, that I have used the word uncomplicated in connection with it.

In order to facilitate discussion I shall at once state my opinions and the methods of practice which I have come to adopt in these injuries. They are as follows:

Humerus.

1. In the treatment of fractures of the lower end of the humerus the divergent angle between the axes of the arm and forearm must be preserved; and hence dressings which interfere with the normal difference in level of the radius and ulna are not permissible.

2. Fractures of the lower end of the humerus of ordinary

severity are, as a rule, more successfully treated in the extended than in the flexed position; because the carrying function is less liable to be impaired.

3. Passive motion at an early date is harmful, and should be deferred until union has occurred and the dressings have been finally removed.

4. Good results as to anatomical conformation and as to motion are generally to be expected and can usually be obtained.

5. Recent fractures in which satisfactory coaptation is not obtainable under anæsthesia may with propriety be subjected to exploratory aseptic incisions. Old fractures in which deformity and impairment of function are marked may, within certain limitations, be subjected to re-fracture or osteotomy for the relief of these conditions.

Radius.

1. Fractures of the lower end of the radius vary comparatively little in their general characteristics, because but one form is usual.

2. Muscular action has little or nothing to do with producing or maintaining the deformity.

3. Immediate reduction of the fragments is the esssential of treatment.

4. Many of the splints devised for the treatment of this fracture have been constructed in ignorance of the pathology of the condition.

5. The ordinary fracture of the lower end of the radius usually requires no splint, and should be dressed with a wristlet of adhesive plaster or bandage.

6. When a splint is required, a narrow short dorsal splint fixing the wrist is all that is necessary.

7. The method of dressing here advocated is the best, because it, by avoiding cumbersome appliances, annoys the patient as little as possible, and it permits free voluntary movements of all the finger-joints.

8. Passive motion is unnecessary until union has occurred and the dressings have been finally removed.

9. Good use of the wrist and fingers is early obtained and the anatomical conformation is restored as well as, and perhaps better than, by other more complicated dressings.

10. Fractures which have been improperly treated by omission of immediate reduction, may, with considerable success, be subjected to re-fracture even after the lapse of several months. At later periods readjustment may be possible only by osteotomy, which is a legitimate means of treatment.

Fractures of the Humerus.

Surgeons now generally recognize the necessity of maintaining the so-called carrying function of the upper extremity, and methods of treatment which tend to alter the relations of the axes of the arm and forearm should be discarded. The reasons assigned by Allis[1] for the frequent occurrence of "gun-stock"

Fig. 2.

Normal angle of bones of forearm. (Allis.)

deformity after fracture of the lower end of the humerus, are, I think, correct. The commonly employed splints, and the dis-

[1] Annals of Anatomical and Surgical Society, Brooklyn, August, 1880.

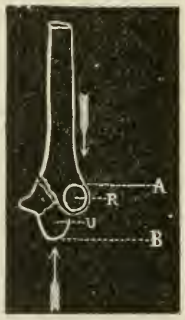
placing influence of the ordinary sling tend to bring the ulna and radius on the same level, and thereby destroy the divergent angle of the bones at the elbow or create an angle in the oppo-

FIG. 3.

Differing planes of the radius and ulna. (ALLIS.)

site direction. It is asserted that the ascent of the internal condyle one-quarter of an inch will destroy the normal angular deflection at the elbow.[1] The direction of line of fracture and the point at which it enters the joint have, it must be remem-

FIG. 4.



Relations of articulating portions of radius and ulna to humerus, in fracture of internal condyle, showing ease with which ulna and broken condyle can be forced up by splints and bandage, or sling, thus destroying carrying function of the arm. (ALLIS.)

bered, a great influence on the possible occurrence of change in the axes of the arm and forearm. The principle is the same as that utilized in condyloid and supracondyloid osteotomy in knock-knee.

[1] Stimson, Fractures and Dislocations, p. 403.

Packard makes the important assertion[1] that the plane of the articular surface of the humerus corresponds with the oblique furrow of the skin on the anterior part of the joint. We know, moreover, that when the elbow is flexed at a right angle the axes of the arm and forearm coincide. For this reason it is much more difficult to be sure that the fragments are in the proper position, to insure integrity of the angular deflection, when the arm is about to be dressed in the flexed position, than when the surgeon compares the two arms and replaces the fragments while the injured limb is extended.

FIG. 5.

Diagram showing relation of ulna to lower end of humerus with the line of fracture entering the joint at different points. Some lines of fracture permit slipping up of the internal condyle under injudicious use of splints; other lines of fracture do not. (ALLIS.)

In my experience the angle of deviation is greater in muscular persons than in those of opposite development. In women and children it sometimes scarcely exists. It is well to remember that Pilcher says[2] that there is a variation in the degree of this angular deviation in normal arms of the same individual. He found as much as five and one-half degrees difference in the two arms of one of the children whom he measured. In his opinion muscular action, particularly the action of the triceps, has much to do with the creation of the angular distortion which often occurs when elbow fractures are treated in the flexed position.

I see no objection to the surgeon cutting down upon the displaced fragments when it is impossible to properly coapt the

[1] Internat. Ency. Surg., vol. iv. p. 144,

[2] Annals of Anat. and Surg. Soc., Brooklyn, Sept. 1880, p. 367.

irregular surfaces. An aseptic exploration of a closed fracture is better surgery than the conservatism which gives a rigid and distorted elbow.

A surgeon who fully realizes the probability of impairment of the carrying function in these fractures can without doubt treat them equally well in either the flexed or the extended position. Accurate readjustment of the fragments and provision for careful maintenance of the coaptation will usually produce good results. In the flexed position plastic dressings, made with gypsum and similar agents, are far preferable to angular splints of wood, metal or other rigid material. The former are made to accurately conform to the limb immediately after the surgeon has reduced the fracture; hence there is not much opportunity for subsequent displacement to produce a change in the normal outline. If rigid splints are applied, however, the movable fragments are liable to be forced into undesirable relations by the bandage and sling. This occurrence is possible for many days after the fractured portions of the humerus have been skilfully adjusted by the surgeon.

Practitioners who see comparatively few cases are, however, less liable than surgeons to appreciate the probability of a "gun-stock" deformity. In the flexed position of the elbow, moreover, the deviation of the axes of the arm and forearm does not exist; hence in this position a slight displacement of the plane of the articular surface of the humerus is easily overlooked. For these reasons the extended position is the better

FIG. 6.

Deviating angular splint for fractures at the lower end of the humerus.

for general adoption, since the angularity of the unbroken arm is then noticeable, and any interference with the normal deviation is very apparent.

If the sentiment of the profession was in favor of usually

treating these fractures in the extended position there would be very many less deformed arms. A specialist will vary his methods to suit each case ; but for general use is needed a rule that will lead the practitioner of average experience and intelligence to get good results in the greatest possible number of cases. The extended position will, I believe, secure this result. By " extended position " I mean that position in which the elbow is extended almost, but not quite, fully. The forearm and hand are to be supine. Complete extension would be exceedingly uncomfortable to the patient, and is not what is meant.

Dr. Lane gave in his paper in the *Transactions* of last year a very interesting account of the views of various surgical authorities on this question.

I have for a number of years used a narrow, light, wooden splint, long enough to extend from the upper part of the arm to the wrist, having a divergent angle at the elbow. I usually make this splint out of a thin board at the time of dressing the fracture, using the sound arm as a guide. A little padding of cotton or oakum is laid in the bend of the elbow, to fill the hollow present there, because the joint is not fully extended. This padding is not intended to make pressure on the fragments. In cases where there is too much swelling to permit extension of the arm I apply an anterior obtuse-angle splint or a posterior obtuse-angle trough for a few days; but I soon change it for the anterior deviating splint above described. This method of treating fractures above the elbow has been fully discussed by me elsewhere.[1]

In supracondyloid fractures, however, I have usually employed the flexed position, maintained by an anterior right-angle splint or a posterior right-angle trough. The reading and investigation necessitated by the preparation of this paper have, however, caused me to incline towards the adoption of the extended position for supracondyloid as well as condyloid fractures. The relaxation of the triceps so induced seems to me to be desirable,

[1] Modern Surgery, Lea Bros. & Co., Phila., 1890, p. 399.

especially as the supination of the forearm and hand relaxes the biceps, one of the main opponents of the triceps. This position, therefore, relaxes two of the strong factors tending to produce the backward displacement, which is so much feared by many in supracondyloid fractures or epiphyseal disruptions.

Allis,[1] Pilcher,[2] Verneuil,[3] Gibney, Powers[4] and others are correct when they deprecate the early employment of passive motion in fractures about the elbow and other joints. Stimson put it very ably when he says,[5] that "the ankylophobia of the surgeon is more dangerous to the patient than the traumatism." Orthopædic surgeons give the same evidence in the study of the collateral topic of rest in joint diseases. Phelps[6] has seen normal joints immobilized for ten, twelve, and eighteen months without ankylosis occurring in either the normal or the inflamed articulations. Experimental study on dogs has shown the same fact.

In 1885 I stated in an article on "False Doctrine in the Treatment of Fractures"[7] that passive motion should not be commenced until union of a fracture is pretty well accomplished. My present belief is that it is best to delay it until union has occurred and the retaining dressings have been finally removed. If begun earlier it is very likely to be harmful by giving pain, causing arthritis, or displacing the fragments.

The advice of Hamilton urging early passive motion in elbow fractures is probably responsible for many stiff elbows. He says[8] concerning fractures of the base of the condyles, "At a very early date, so early, indeed, as the seventh or eighth day, the splint should be removed, and while the fragments are steadied the joint should be subjected to gentle passive motion.

[1] Annals of Anatomical and Surgical Society, Brooklyn, Aug., 1880, p. 306.
[2] Ibid., Sept., 1880, p. 369.
[3] Quoted by Pilcher.
[4] Medical Record, New York, Dec. 22, 1888.
[5] Trans. Amer. Surg. Assoc., 1891, p. 269.
[6] Proceedings Phila. County Med. Soc., 1891, p. 439.
[7] Journ. Amer. Med. Assoc., May 30, 1885, p. 589.
[8] Treatise on Fractures and Dislocations, eighth edition, edited by Stephen Smith, 1891, p. 244.

This practice should be repeated as often as every second or third day, in order to prevent, as far as possible, ankylosis." Could any advice be more erroneous or dangerous than this; and yet it has appeared in succesive editions, and is repeated as authoritative in many quarters? Dr. Stephen Smith fortunately adds an editorial note in the edition of Hamilton just quoted, saying that many surgeons believe early passive motion in this fracture to be detrimental and never to be practised. It is to be hoped that the wisdom of this note will correct the monumental error of the original text.

It is interesting to note that Dr. L. C. Lane[1] believes that the flexed position of the elbow during treatment of fractures of the region under consideration is more favorable to ankylosis than the extended; because there is more room for neoplastic deposits in the anterior muscular and fibrous structures, which are plicated during flexion.

Deformity and impaired mobility may at times be improved by refracture or osteotomy done with careful asepsis. Cases for such radical measures must, however, be judiciously chosen.

Correspondence with the Fellows of this Association, the Members of the New York Surgical Society and the Fellows of the Philadelphia Academy of Surgery shows me that I am correct in the opinion that such uncomplicated fractures of the lower end of the humerus as I am discussing, usually recover, if judiciously treated, with little or no deformity and with good motion. My experience then is simply corroborative of that of other surgeons.

Letters sent to these surgeons elicited eighty-eight replies:

I.

a. The number who preferred the flexed position in treatment were .	65
b. The number who preferred the extended position in treatment were	15
c. The number who employed both positions in treatment were . .	7
d. The number who gave no definite answer to the query was . .	1
Total	88

[1] Trans. Amer. Surg. Assoc., 1891, p. 413.

II.

a. The number who preferred the flexed position because it was thought to insure better coaptation were	37
b. The number who preferred the flexed position because there was a fear of ankylosis were	18
c. The number who preferred the flexed position because it was more convenient and comfortable for the patient were	6
d. The number who gave no definite reason or answer were	4
Total	65

III.

a. The number who began passive motion within four weeks were	64
b. The number who began passive motion after four weeks were	7
c. The number who did not use passive motion at all were	15
d. The number who gave no definite answer to the query were	2
Total	88

IV.

a. The number who usually expected to obtain good use of the joint were	80
b. The number who were doubtful about obtaining use of the joint were	8
Total	88

In studying these tables it must be remembered that the manner in which some of the correspondents replied made it a little difficult for me to determine under which heading they should be classed. I have endeavored to classify the replies correctly by studying the apparent feeling of the writer as well as his phraseology. In some cases several reasons were given for the choice of the flexed position; in these I tabulated the one to which most importance seemed to be attached. The views of each surgeon will be found in the detailed tables at the end of this paper. The small letters affixed to the replies indicate under what heading they have been put in this abstract. I am rather astonished at the number who fear ankylosis; and am interested in the admission of some that routine is the only reason they have for adopting certain lines of treatment. The number who cling to passive motion in the early weeks is larger than I anticipated. Those who begin passive motion after four weeks might with propriety be classified with those who attach no importance to it, since union of the fracture has become quite firm in four weeks.

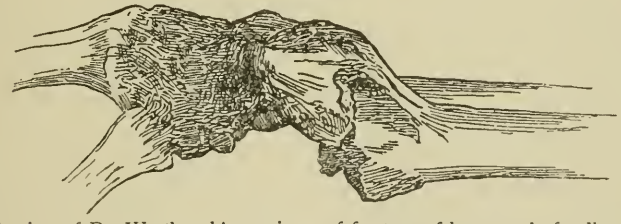
Fractures of the Radius.

It is unfortunate that the name of Colles is still associated with fractures of the base of the radius. Such personal nomenclature is always objectionable; and is especially so here, since Colles placed the seat of lesion at a higher point than that at which fractures of the base of the radius usually occur.

Fractures of the lower end of the radius vary very little in their essential clinical details. The degree of the displacement, comminution, or impaction is not always the same; but through all the variations, due to the character and continuance of the vulnerating force, the surgeon sees the same essential lesion, situated at nearly the same point of the bone. The treatment, too, needs little variation, and consists in immediate forcible reduction.

The usual line of fracture is situated at from one-third to three-quarters of an inch above the articular surface of the bone, and is generally more or less transverse in direction, though

Fig. 7.



Profile view of Dr. Westbrook's specimen of fracture of lower end of radius. Annals of Anatomy and Surgery, Vol. III. (1881), p. 114.

some tendency to lateral or antero-posterior obliquity is not infrequent. Displacement of the lower fragment backward upon the lower end of the upper fragment is the ordinary deformity, and is due to the fracturing force, not to muscular contraction. Some impaction is not unusual from driving of the dorsal wall of the upper into the cancellated structure of the lower fragment, and the actual loss of substance from crushing of the bony tissue is not infrequent. When impaction does not exist,

entanglement of the fragments by interlocking of the irregular surfaces is very common. At times there is no displacement; at others it occurs only at the radial, and not at the ulna side of the lower fragment, which then is tilted obliquely backward. The styloid process of the radius is carried upward and backward by this displacement, and therefore the radial styloid process is often as high as, or even higher (that is, further from the hand) than the ulnar styloid process. This angular displacement tends to throw the articular surface with the attached carpus upward, backward and to the radial side, and produces the peculiar deformity so recognizable. Sometimes the integument over the ulnar head is torn asunder by this radial displacement of the hand, and the ulna may even protrude through the laceration. Such a wound by no means implies an open or compound fracture of the radius, for frequently the wound has no communication with the fractured surfaces.

The fracture just described, with or without comminution of the inferior fragment, is the one usually seen. Associated fracture of the lower end of the ulna, of the ulnar styloid process, or synchronous rupture of the radio-ulnar ligaments, and epiphyseal fracture may, however, occur. Fracture of the lower end of the radius with forward displacement is very rare.

FIG. 8.

Deformity in the usual fracture of lower end of radius. Taken from cast made before reduction and treatment.

Fractures identical in pathology and deformity with those found clinically can readily be produced in the surgical laboratory by sudden hyperextension of the hand caused by heavy blows.

As there is no opportunity for living muscles to assist in the production or maintenance of deformity here it is reasonable to suppose that muscular action has little influence upon the

fracture in patients. The tonic contraction of the muscles of the forearm may be an agent in holding the fragments in their abnormal position, when there is simple entanglement of the rough surfaces without true impaction, and the tendons may similarly cause the normal relations to be maintained after

FIG. 9.

Deformity produced by an experimental fracture of the lower end of the radius in a cadaver preserved by zinc chloride. A heavy blow was struck on palm while hand was fully extended and forearm vertically placed with elbow on table.

reduction by the surgeon. Further than this, muscular influences are unimportant, if my experience has taught me correctly. The conditions in a transverse fracture of the broad base of the radius are very different from those in an oblique fracture of the shaft of this or other long bone surrounded by muscular bellies. The statement[1] that there is a great tendency to displacement by muscular action after reduction has been accomplished is unconfirmed by clinical observation unless there be unusual comminution of the lower fragment. When the radius is broken two to two and a half inches above the joint, or in the middle third of the shaft, the conditions are probably different; but I am not considering such fractures at this time.

It seems impossible that any surgeon would think of advocating the omission of immediate or complete reduction of the lower fragment in this fracture, in which non-union is practically unknown. Yet, as I have stated in the earlier paragraphs of this communication, M. Despres does so. Equally astonishing to me is the advice of Dr. Wyeth[2] that "in aged patients, who have considerable impaction, it is not advisable to break up the impaction." Mr. Southam[3] speaks of cases in which

[1] Holmes' System of Surgery, Am. ed. by Packard, 1881, vol. i. p. 864.
[2] Text-book on Surgery, 1888, p. 296.
[3] Treves' Manual on Surgery, vol. ii. p. 54.

the deformity cannot be made to disappear, and another writer[1] says that the impaction should be undone if possible, implying that impossibility of reduction is not very unusual. About ten years ago I treated a woman of perhaps seventy years of age who had fallen from a roof to the ground, breaking both radii with great displacement. My duty would not have been done, in my opinion, if I had not used the same force in overcoming the interlocking of the fragments in this old woman as I would have employed in a young person. She rapidly recovered with perfect use of wrists and fingers, though distortion at the wrist was marked, because of the probable comminution of the lower fragment and the fact that the woman was imbecile and constantly pulled off the splints and dressings.

That reduction is at times impossible may perhaps be true, but I have never seen an instance which the power of my two hands, aided by leverage across the knee, could not reduce under anæsthesia. Reduction is to be accomplished by force, not by *gentle* pressure and manipulation, as some would have us believe. I usually accomplish it by extension and counter-extension applied to hand and forearm, aided by sudden flexion of the wrist with simultaneous pressure on the dorsum of the lower fragment. This manœuvre is repeated, if necessary, until I feel no ledge of bone at the seat of fracture when I carry my forefinger or thumb along the dorsal surface of the lower third of the radius. The reduction is so quickly done that anæsthesia is generally omitted. In recent cases this manipulation is generally sufficient, but in unreduced cases of several weeks' duration, and sometimes in recent cases, I have been obliged to bend the limb over my knee so as to break up the connection between the misplaced fragments. Very firm impaction, entanglement of the fragments in the tendons, or dorsal periosteal bands may require the surgeon to bend the hand and attached lower fragments strongly backward, in order to release the interlocking, before making traction, flexion and pressure. This manipulation, is, however, seldom necessary.

[1] Druitt's Modern Surg., ed. by Stanley Boyd. Twelfth Am. ed., p. 256.

It has been asserted that the long supinator or square pronator opposes reduction of the deformity; this is undoubtedly a fallacy in so far as real obstacle is offered by these muscles. Mr. Howard Marsh[1] makes the extraordinary statement, "Should reduction not be accomplished on the first trial the attempt should be repeated a week later, when the fragments may have become somewhat loosened on each other, and when, swelling having subsided, manipulation can be more accurately directed."

Dr. John Ashhurst, in a publication issued several weeks ago[2] makes statements equally misleading, and, in my opinion, exceedingly dangerous. The deservedly high reputation of Professor Ashhurst will cause many practitioners to follow his words implicitly. The result will, I fear, be the production of many unnecessarily stiff wrists and fingers after fracture of the base of the radius. He says: "The important part of the treatment is, of course, to keep the fragments in their proper position. If you bear in mind the mode in which the fracture occurs, you can at once see how the compresses which we use should be applied to counteract the deformity." Two compresses, a dorsal and a palmar, and a Bond splint, are used by Dr. Ashhurst, who continues: "When the compresses are brought together the bones are necessarily pushed into position. Even if you cannot accomplish this at once you will find that, by careful dressing, in a few days the deformity will disappear."

It is possible that this method of dealing with a fracture of the lower end of the radius might be admissible and do well at the hands of this eminent surgeon in the case he was discussing, in which the lower fragment might have been greatly comminuted. I feel very sure, however, that the omission to call attention to the necessity of immediate and complete reduction as a first step in all these fractures is a grave error, and that the apparent or intentional direction to rely upon the compresses to overcome the deformity is most unwise.

[1] Heath's Dict. of Pract. Surg., vol. ii. p. 293.

[2] International Clinic, vol. i. p. 201. Philadelphia, 1892.

Further on in his clinical lecture, which was delivered at the University Hospital, Dr. Ashhurst states: "I have seen sloughing occur from the pressure of the compresses when this precaution has not been adopted." The precaution to which he has reference is the use of "lead-water and laudanum or some other soothing fomentation" in the early stages of the treatment, or when there has been much bruising. Is it not possible that the sloughing was the result of injurious pressure by the compresses rather than the omission of local fomentation? The use of the latter, as I have previously said in speaking of fractures of the elbow, is always undesirable and useless.

In a paper[1] read before the Philadelphia Academy of Surgery about eighteen months ago I mentioned that I had repeatedly been obliged to refracture and reduce fractures of the lower end of the radius after treatment in splints by other physicians. In a series of forty-eight cases reported at that time six cases came to me with the lower fragment still unreduced, though a splint had been applied in each instance. This personal experience can be duplicated, doubtless, by nearly every surgeon who sees many fractures in hospital or consultation practice; and is due to the fact that teachers and text-books do not sufficiently emphasize the necessity for reduction. The profession should be shown that the treatment of fractures of the lower end of the radius is reduction, and *not* a splint, either with or without compresses.

The ignorance of the true pathology of this fracture was formerly so great that many ridiculous splints have been devised for its treatment. Many were constructed on the theory that the extensor muscles of the thumb were a cause of the deformity; and not few were employed that failed to recognize the curvature of the palmar surface of the lower portion of the radius. These errors are intelligible and were excusable; but I fail to appreciate the acumen of the authors who still figure these useless antiquities in their text-books or of the surgeons who advocate and use them.

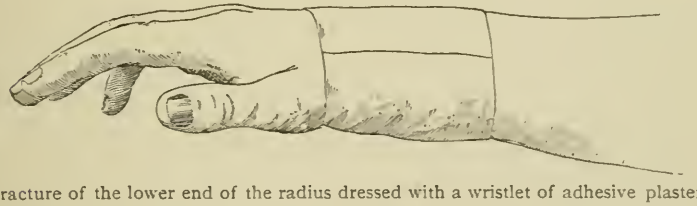
[1] Medical News, December 13, 1890, p. 615.

After reduction the ordinary fracture of the inferior extremity of the radius rarely requires such rigid support as a splint, because the transverse character of the fracture gives a broad rough surface of contact, and the extensor tendons running over the dorsal surface of the bone act as tense straps to hold down the lower fragment.

If there is much comminution, or if the patient is a careless man or a romping boy, it may be wise to use a short and narrow dorsal splint upon the back of the wrist. It may be made of a piece of cigar box, a strip of metal, or consist of two or three whalebones, such as are used in ladies' dress waists. It should only extend from the middle of the metacarpal bones to the junction of the middle and lower thirds of the forearm, being, therefore, about six inches long. Its width need not be over one inch. It can be held in place by adhesive plaster or a bandage encircling the limb. This dressing should not be employed longer than ten days or two weeks at the most, during all of which time the patient should use his fingers as freely as pain and swelling will permit.

In the great majority of cases this dressing is unnecessary, and a simple roller bandage, or a wristlet made of two or three

FIG. 10.



Fracture of the lower end of the radius dressed with a wristlet of adhesive plaster.

superimposed strips of rubber adhesive plaster, is all that is required. It makes no difference whether the hand is maintained in the prone or supine position during treatment. The patient holds it first in one and then in the other, varying the position at pleasure. This simple method of treating the fracture gives the patient the necessary freedom in moving his fingers, from the instant the fracture is set; does not prevent his wearing a

sleeve, allows inspection of the parts, and is inconspicuous, light, clean, and efficient. If the surgeon is unwilling to use either of these forms of dressing the moulded metal splint devised by Levis for application to the palmar aspect of the forearm and hand is the best of the special splints. The arched or curved nature of the palmar surface of the lower third of the radius prohibits a straight splint being applied there; but on the dorsal surface a straight splint may be used.

Passive motion should not be employed in fractures of the lower end of the radius, for the reasons that I have given in speaking of humeral fractures. It is not needed for the wrist-joint; and the finger-joints are being moved constantly by the patient during the entire treatment, except when pain or swelling makes this impracticable. Under such circumstances passive motion would not be desirable, if practicable.

When, in ten days or two weeks, sufficient union has occurred for the dressings to be removed, soaking in warm water, friction with liniments, and passive motion are useful to hasten the restoration of function. This is usually very little impaired except in rheumatic subjects, and in cases where great associated injury to the soft parts has occurred.

The dressings employed may usually be discarded in ten days or two weeks in ordinary cases, and in three or four weeks in comminuted fractures. Long retention of the appliances is unnecessary, and even deleterious when splints are employed, because of the greater tendency to stiffness induced.

In properly treated cases of ordinary severity, perfect use of wrist and fingers is obtained within a few weeks after injury. Patients can often write a little and use the hand for dressing themselves within ten days or two weeks. This facility varies with the amount of comminution and inflammation. Persons of rheumatic or gouty tendencies are probably more liable to stiffness of the fingers and wrist than others. Fractures in other regions present the same complication in such individuals. Much of the rigidity of wrist and fingers attributed to rheumatic and gouty causes, or to the senility of the patient, I believe to be due to imperfect reduction of the fragments and

to unscientific and unwise treatment. I have not recognized the stiffness and rigidity after this fracture in the aged, which some authors mention with emphasis. I expect the same early and perfect freedom of motion in them as in the young, except in so far as the aged are more liable to rheumatism and gout.

It is the opinion of Bryant[1] that "after this form of fracture the wrist-joint rarely recovers its normal movement." My belief is that after this fracture the wrist-joint usually, but not always, perfectly recovers its normal movement, provided that reduction has been complete at the outset of the treatment and the case well managed. Moderate deformity, due to shortening of the radius, alteration in the plane of its articular surface and abnormal prominence of the head of the ulna, is not unusual, but is unimportant if motion is perfect, as it generally is.

Mears[2] advocates early passive motion, and recommends that after the removal of the splints, at the end of five or six weeks, the manipulations should be continued to restore function and "remove the rigidity of the articulation which inevitably follows fracture at this point, and enable the patent to regain, to a great degree, if not completely, the function of flexion, extension, supination, and pronation." This seems to indicate his belief that final restoration of motion is possible after a long interval. My experience teaches me that it is usual almost as early as the date at which Dr. Mears discards the splints.

The statement of Stimson[3] in discussing this topic is, "This rigidity of the fingers is due in part to their prolonged immobilization and in part to inflammation within the sheaths of their tendons in the forearm." This is probably correct, and indicates the harmfulness of many methods of treatment in which the fingers are confined from four to six weeks. Under prognosis, Hamilton[4] gives the essence of the matter in these words: "In cases treated by myself, where I have exercised great care in reducing the fragments thoroughly, and where the bandages

1 Practice of Surgery, 4th American edition, 1885, p. 880.

2 Practical Surgery, 1885, p 206.

3 Fractures and Dislocations, p. 460.

4 Fractures and Dislocations, edition of 1891, edited by Dr. Stephen Smith, p. 234.

and splints have not been applied too tightly, nor kept on too long, deformity to any considerable extent is the exception, and the stiffness is soon dissipated."

If great comminution or crushing has been incidental to the fracture, perfect restoration of the anatomical contour of the wrist may be impossible. Recurrence of deformity may take place after reduction has been well accomplished, if there be unusual comminution of bone and laceration of ligaments. Such cases show preternatural mobility and marked crepitus as symptoms. These cases, and even those of less severity, quite often present, after union and recovery of normal motion, an undue prominence of the ulnar head and a deflection of the hand to the radial side. This deformity is due to shortening of the radius, the result of imperfect coaptation of fragments, absorption of small particles of the bone separated by crushing, change in the plane of the articular surface of the radius, or interference in young patients with the normal growth at the epiphyseal cartilage. This alteration in the anatomical conditions of the lower end of the radius may make it possible for the patient to voluntarily incline or abduct the hand to the radial side very much more than normal.

In March, 1882, I presented to the Philadelphia County Medical Society[1] several cases of fracture of the lower end of the radius. One was a man of sixty years who, after mounting a high bicycle, had fallen with the machine down a high bank. He fractured the left radius and two ribs. The cure was so perfect that many members of the society could not tell which had been the broken arm. He was by no means young, but never had any stiffness, such as attributed by some writers to age. He has, however, to this day much unnatural latitude of motion when he deflects the hand to the radial side, as the plaster casts of his forearms and hands show.

When the fragments have not been reduced, and vicious union therefore results, the surgeon should, as in mal-union of fractures in other regions, resort to re-fracture. This can be done

[1] Proceedings 1881–82, p. 159.

by bending the limb across the operator's knee, while the patient is under anæsthesia; aided, perhaps, by hyper-extension of the hand and wrist. I have successfully done this as late as eight weeks after injury, and have seen it done five and a half months subsequent to the original traumatism. The correction of deformity will not be as perfect as in cases treated properly from

FIG. 11.

Plaster casts showing abnormal voluntary abduction of hand after fracture of the lower end of the left radius. No deformity and no loss of mobility of wrist or fingers exist. The figure of the right or uninjured forearm shows fullest abduction which is possible in the normal wrist.

the beginning; nor should such good results, as to complete an early mobility of fingers and wrist, be expected. Dr. Richard H. Harte has reported cases in which he did osteotomy to overcome the vicious union. I am inclined to believe that re-fracture would have been possible in his cases, as they were seen early. Osteotomy is undoubtedly, however, the proper treatment when re-fracture requires force liable to do serious damage to the soft parts. An aseptic or antiseptic osteotomy gives no real risks and allows the surgeon to see the bone and choose the exact line of his osseous incision.[1]

[1] Univ. Med. Magazine, 1887.

No.	Surgeon.	Humerus.				Radius.			
		Do you treat fractures of lower end of humerus of ordinary severity in flexed or extended position?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of joint?	What splint do you use for the ordinary fracture of the lower end of the radius?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of wrist and fingers?
1	B. A. Watson	Extended	More easily retained in proper position.	Fifth week in child'n, seventh in adults. *b*	Yes	Colles's fracture, E. M. Moore's system.	Give better results.	Do not usually employ it. *c*	Yes. *a*
2	T. R. Neilson	Flexed	Seems more favorable for coaptation and is more comfortable than extended position. *a*	Generally at end of first week. *a*	Yes	Bond's.	Carefully padded and with compresses it maintains good adjustment in majority of cases.	Generally at 3d dressing. *a*	Yes, except those past middle life *c*
3	F. Lange	Flexed	For securing better apposition and useful position in case of stiffness. *b*	Differs; mostly after 3 weeks. *a*	Gradually	Two (volar and dorsal).	.....	Depends upon the features of case. *a*	Yes; sometimes after prolonged treatment. *a*
4	C. H. Mastin	Extended; I think Allis's method by all odds the proper one.	Because the bones are kept in exact position.	After consolidation is perfect *c*	Always	The so-called Nélaton or pistol splint.	It preserves interosseous space and by overcoming action of the quadratus muscle keeps the fragments in apposition.	After bone is united. *c*	My results have been uniformly successful. I have never had a deformity in any case after having used this method. *a*
5	R. B. Bontecou	Flexed	The fragments are easily kept in position and it is more comfortable. *a*	Third week. *a*	Yes	Any straight board for the palmar aspect, only extending to second phalangeal articulation, with a roll in the palm and compresses under distal end of radius.	It is efficient and comfortable.	Third week. *a*	Yes. *a*

6	W. W. Van Arsdale	Flexed at 80°	Because in case of callus formation in fossa, it is more important to be able to flex the arm than extend it. *b*	At end of fourth week on removal of splints *b*	Limited	One single straight board 10 in. long, 3/16 in. thick, wide as sound wrist; dorsally applied.	Because there is less interference with circulation than with any other method, less deformity and better results.	End of 3d week on removal of splint. *a*	Yes. *a*
7	J. E. Michael	Flexed position.	Comfort and convenience of patient. *c*	Second week, generally. *a*	Usually good, sometimes perfect.	Flat splints, dorsal and palmar, after careful reduction; sometimes Porter's wire splint.	Best by my experience and observation, as well as theoretically correct.	Third week *a*	Yes, and am very rarely disappointed. *a*
8	B. F. Curtis	Usually flex'd, extended for 10 days in fractures which threaten loss of "carrying point."	No answer given. *d*	None; active motion in 4 to 6 weeks. *c*	Yes	Anterior splint, elbow to wrist; posterior splint, elbow to knuckles; both flat and stiff.	.....	Active motion in fingers from first, and of wrist in 7 to 10 days. *a*	Yes. *a*
9	J. McCann	Flexed	More complete relaxation of muscles of arm and forearm; natural position of limb at rest; better coaptation of fragments. *a*	Not until all tenderness has disappeared from joint. *a*	Good	A splint slightly curved to fit contour of wrist and hand and of forearm.	It affords good support to fragments, fixes wrist, and allows motion in fingers.	Not until late, after union of fragments and disappearance of pain. *c*	Good in almost every case unless bones are much comminuted. *a*
10	R. H. M. Dawbarn	Flexed	In case of bad results (ankylosis) it is a better position. *b*	Not until I think bony union is complete, say, 4 to 7 weeks. *c*	Yes	I think the kind of splint very *unimportant*; the proper reduction, usually under ether, is the thing; after that is done my preference is plaster-of-Paris both here and always for splinting.	....	After bony union is complete, say four to six weeks. *c*	Yes. *a*
11	A. G. Gerster	Extended	Because reduction of fragments is secured easier in this than in flexed positino.	Ten days to three weeks. *a*	Mostly, though not always.	Pilcher's wristlet, if there is no tendency to displacement; o herwise, a dorsal plaster-of-Paris splint.	The latter is moulded to extremity and is easily removed for examination.	Insist on active movements of fingers from beginning; commence passive motion after consolidation. *c*	I do. *a*
12	H A. Wilson	Extended	To prevent angular deformity.	Beginning of fourth week. *a*	Yes, generally.	Plaster-of-Paris in form of Levis splint.	Accurately adapted, and because Levis proved that position necessary.	In third week. *a*	Expect good use of wrist and delayed good use of fingers *a*

No.	Surgeon.	Humerus.				Radius.			
		Do you treat fractures of lower end of humerus of ordinary severity in flexed or extended position?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of joint?	What splint do you use for the ordinary fracture of the lower end of the radius?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of wrist and fingers?
13	T. J. Dunott	Usually prefer extended.	The complications are often different.	No regular time *d*	Partial	Straight splint.	After coaptation, under ether, has given me better results.	No stated time *a*	Yes. *a*
14	J. S. Wight	Position of right angled flexion.	It gives the best possible reduction of the fragments if ankylosis occurs; a useful limb. I have operated on a large number which have been treated in the extended position by forcible flexion or by exsection. *b*	In 2 or 3 days *a*	As a rule, I obtain good use of the joint.	A trough splint made of wire cloth.	This splint supports the ulna and comes up in front and on the back of the forearm and the hand.	In two or three days. *a*	Yes. *a*
15	Geo. R. Fowler	Extended for the first 10 or 15 days.	No answer given.	From 10 to 15 days *a*	Yes	No splint whatever; a simple bracelet of broad adhesive plaster, with or without the use of a pad to support the ulna, according as the latter is displaced or not	No other apparatus is needed; motion is not restricted.	Usually not necessary. In two or three weeks the dressings are abandoned and active movements encouraged. *c*	Invariably. *a*
16	V. P. Gibn y	No answer given.	No answer given.	I would never begin passive motion. *c*	By rejecting absolutely passive motion I would expect to obtain a good use of the joint.	No answer given.	No answer given.	I would never begin passive motion. *c*	No answer given *d*

17	F. S. Dennis	Depends upon line of fracture—if extended, weight and pulley, like Buck's extension to knee.	No answer given.	Two weeks.	Not always; depends on circumstances.	Two lateral splints reaching to lower end of lower fragment.	No answer given. *a*	Two weeks. *a*	Yes. *a*
18	DeF. Willard	Extended, as a rule: not invariably.	Less deformity.	Third week. *a*	Yes	Levis, or two straight	No answer given.	Third week *a*	Yes. *a*
19	L. C. Lane	Extended	Thus displacement of condyloid fragment is prevented	Never later than 48 hours. *a*	Yes	Hollow, straight splints ending at the wrist	For such dressing permits movement of wrist and hand.	At once. *a*	After 45 years of age function of these parts will remain impaired. *c*
20	Basil Norris	Flexed	From fear of ankylosis. *b*	Following day. *a*	Eventually	Silver fork.	Admits of free use of fingers	Following day. *a*	Yes. *a*
21	Jos. Ransohoff	Flexed	If ankylosis results most favorable position. *b*	Two weeks or ten days. *a*	Yes	Levis palmar splint.	After reduction by hyperextending as good as any other.	Ten days to two weeks. *a*	Yes. *a*
22	Chas A. Powers	Flexed at an angle of 110° to 120° retaining normal angle between axes of arm and forearm.	Results seem to justify such course. *a*	Practically never *c*	Yes	Two flat, heavy pasteboard splints.	Results seem to justify this procedure.	Never. *c*	Yes. *a*
23	J. D. Bryant	Thus far always in the flexed position	Comfortable and convenient for the patient. Best posture if ankylosis occurs. *b*	Do not consider passive motion essential to prevention of ankylosis; employ it occasionally. *c*	Yes	Palmar and dorsal splints, padded to correct deformity	It is simple, comfortable, and effective	Little attention is paid to passive motion. It is not attempted until splints have been removed.	Yes. *a*
24	T A. McGraw	Flexed at acute angle with lateral angular splints.	Fear of ankylosis. *b*	End of week or ten days. *a*	Yes, usually.	Two straight, wide splints.	I have always obtained good results if I have been able first to reduce the deformity.	End of week. *a*	Yes; except in old people, those disposed to articular rheumatism and in great injury of joint and tendons. *c*
25	C. W. Dulles	Flexed invariably; metal trough preserving obliquity of axes of arm and forearm.	Because I can secure thus the conditions requisite for good union with normal anatomical position and direction of *whole* arm. *a*	Move elbow-joint from beginning of treatment when changing splints. *a*	Yes	Always a straight posterior splint from elbow to *first* interphalangeal joint.	An accurate, cool, and clean dressing.	No occasion for passive motion, for have motion during all the time of treatment. *c*	Yes. *a*

No.	Surgeon.	Humerus. Do you treat fractures of lower end of humerus of ordinary severity in flexed or extended position?	Humerus. Why?	Humerus. When do you begin passive motion?	Humerus. Do you usually expect to obtain good use of joint?	Radius. What splint do you use for the ordinary fracture of the lower end of the radius?	Radius. Why?	Radius. When do you begin passive motion?	Radius. Do you usually expect to obtain good use of wrist and fingers?
26	Parker Syms	Flexed; sometimes have to vary this to replace fragments.	For better position of fragments, and comfort and rest. *a*	Fourth week. *a*	Yes	Long palmar and dorsal, fixing hand.	To secure complete fixation.	Fourth week. *a*	Yes. *a*
27	A. Vander Veer	Flexed	More comfortable for patient, and long time treatment among surgeons here. *c*	End of third or fourth week. *a*	Yes, in children; not always in adults.	Lateral straight splints; treat many cases without any splints.	Secure best results and greatest comfort.	End of third week. *a*	Yes. Not always however. *a*.
28	John B. Roberts	Extended	Carrying function is less liable to be impaired.	Not until union has occurred and dressings finally removed *c*	Yes	No splint or straight dorsal.	Simplest and best.	Not until union has occurred and dressings finally removed *c*	Yes. *a*
29	Thomas Bryant (London)	Flexed	To relax muscles which move bone. *a*.	At end of second or third week. *a*	Yes	Carr's is the best.	It supplies wants of case, and is comfortable.	At end of 10 days *a*	Yes. *a*
30	F. W. Murray	Flexed	Position more comfortable to patient, and functional results good. *c*	Third to fourth week. *a*	As a rule, yes; but it depends on nature of fracture	Straight, wooden splints, anterior and posterior.	Simplest and best, and easiest of application.	In fingers ten days. In wrist third or fourth week. *a*	As a rule, yes. In old people there is stiffness at times. *c*
31	John E. Owens	Flexed	Fear of ankylosis. *b*	4 or 5 weeks in supra-condyloid fracture, and 2 weeks in fracture of a condyle. *a*	Yes	Pistol shaped; compress over back of wrist and an anterior board splint or Levis splint.	Use first when the deformity indicates, the second for the same reason, the last when there is no deformity.	In about two weeks. *a*	The greater the original deformity the greater is likely to be the impairment of function. *b*

32	N. Senn	Extended	In order to prevent rotation of forearm and preserve normal angularity between forearm and arm.	After bony union has taken place *c*	Yes	Have no faith in splints.	Because perfect reposition brings fragments accurately in apposition. They remain so without mechanical support.	After bony union has taken place. *c*	Fair use of hand and fingers after several months. *b*
33	Reginald Harrison (London	Flexed generally.	For accurate apposition and future usefulness. *a*	Two weeks. *a*	Yes	Straight splint down to middle of hand.	Best apparatus.	Ten days. *a*	Yes; if fingers are not cramped by the splint. *a*
34	Victor Horsley (London)	Flexed elbow 90°.	Comfortable, convenient, and affords the best means for relaxing the muscles. *a*	One month; gently. *b*	Yes	Carr's.	Most even support; most opposition to reëstablishment of deformity; least confinement of fingers.	Fingers 10 days. Wrist 1 month *a*	Yes. *a*
35	J. Ewing Mears	In flexed position.	Better apposition of the fragments is secured by this method *a*	At the end of 12 to 14 days. *a*	Yes	Bond's or Coover's.	Apposition more easily maintained and comfort given to the patient.	Eight to ten days *a*	Yes. *a*
36	W. T. Briggs	Extended	Muscles have least tendency to displace fragments.	Not until bones are firmly united. *c*	Yes	Levis's splint or one that acts on the same principle.	Maintaining position as well or better than any other apparatus.*	After bone is pretty firmly united. In old subjects sometimes very early. *a*	In the young, yes. In the old considerable stiffness at times. *c*
37	E. M. Moore	Flexed for a week, then angle changed every other day by a new splint.	Find it successful. *a*	Changing splint gives passive motion enough. *a*	Yes	None; cylindrical compresses to hold up ulna while sling allows hand to hang down.	Replaces ulna and draws extensor tendons over fragments.	Not answered. *d*	Not answered *d*
38	L. A. Stimson	Flexed	For reasons given in paper last year. *a*	If at all, fifth week. *c*	Yes	Moulded plaster-of-Paris.	Fits and stays best.	I have the fingers moved from the first. *a*	Yes. *a*
39	S. H. Weeks	Flexed	Maintains the fragments in best position. *a*	Second week. *a*	Yes	Carr's.	Maintains the fragments in the best position.	Second week. *a*	Yes. *a*
40	Wm. J. Taylor	Flexed	Comfort to patient. *c*	End of third week. *a*	Yes	Levis's tin splint always.	Retains fragments in position better than others; less deformity.	Beginning third week. *a*	Yes, almost always. *a*
41	W. H. Carmalt	Flexed with extension (traction J B. R.)	Most comfortable. *c*	Two weeks. *a*	Yes, depending upon age.	Straight antero-posterior.	It usually meets indications; if it does not I use another.	Two weeks or less. *a*	In children and youth, yes; after 50 years, no. *c.*

No.	Surgeon.	Humerus.				Radius.			
		Do you treat fractures of lower end of humerus of ordinary severity in flexed or extended position?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of joint?	What splint do you use for the ordinary fracture of the lower end of the radius?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of wrist and fingers?
42	John B. Deaver	Flexed	Believe the results better. *a*	Two weeks. *a*	Yes	Bond and compress.	Believe the results better than by any other means.	Two weeks. *a*	Very good. *a*
43	J. R Weist	Flexed	Best position of arm if loss of motion occurs. *b*	Ten days. *a*	Yes, often loss of perfect extension.	Levis's metallic.	Seems to fill indications perfectly.	In one week. *a*	Yes, except in old persons. *c*
44	M. H. Richardson	Flexed	Better position of reduced fragments. *a*	Three to four weeks. *a*	Yes	Posterior spoon and anterior flat.	Simple and effectual.	Three weeks. *a*	Yes *a*
45	A. J. McCosh	Flexed	In case of ankylosis and no disadvantage. *b*	Fourteenth to twenty-first day. *a*	Yes	Short antero-posterior splint.	To prevent stiffness at wrist joint	Twenty-eighth to thirty-fifth day, fingers moved from outset. *b*	Yes *a*
46	Oscar H. Allis	Extended	Published reasons in Annals of Surgery.	After union, say 4 weeks. *b*	Yes	Modified Bond.	After reduction of deformity it affords rest.	Early after first week. *a*	Yes, in cases of intense severity *a*
47	T. G. Morton	Flexed	Less danger of displacement of fragments. *a*	According to age 4 weeks. *a*	Yes, if accurate reduction is secured	Immaterial; padded light splints. Bond or modification makes little difference what splint, if reduction is attended to.	The essential treatment consists in absolute and early reduction under ether.	Fingers early; wrist 3 weeks. *a*	Yes, if reduction has been complete. *a*
48	T. S. K Morton	Flexed	For fear ankylosis in extended position, and because cases do well thus. *b*	Almost immediately. *a*	As a rule	Bond or improvised of same nature.	Most comfortable, parts can best be kept in position by pads, joint most relaxed, good results.	Dress every or every other day and commence motion at first dressing. *a*	Confidently in every case. *a*

49	J. W. White	Flexed	More important muscles relaxed, better position of fragments, more comfort during treatment. *a*	If joint is not involved, in three weeks. *a*	Yes	Two straight splints or Bond's splints, preferably the former.	They meet all the indications better than other dressings.	Fingers in a few days, wrist in 3 weeks very generally.	Yes. *a*
50	C. B Porter	Flexed	No answer given. *d*	From third to fourth week.	Yes	Anterior and posterior.	No answer given	Of fingers early and wrists a little in second week. *a*	In young and middle aged, yes. Old, not so good. *c*.
51	H. H. Mudd	Flexed	More comfortable for patient going about and better if ankylosis occurs. *b*	After bone is firm at end of four weeks. *b*	Yes	Simple straight board.	Efficient and comfortable.	No answer given *d*	Yes. *a*
52	W. Meyer	I treat fractures of lower end of humerus (condyles) of ordinary severity in semi-flexed and extended position. Semi-flexed 10 days, flexed 10, extended 8 = 28	To avoid ankylosis *b*	When changing splint and after three to four weeks. *a*	Yes	Hospital practice: pasteboard and hand straight. Private practice: poroplastic felt (hand flexed).	Hospital practice, convenient and sure. Private practice, result more insured.	In renewing splint and after three weeks. *a*	Yes. *a*
53	J. H. Brinton	Flexed by anterior angular splint.	Because with *strong* extension of forearm I can get good results. *b*	As soon as the swelling or inflammatory symptoms subside, eight to ten days. *a*	Yes	Bond's in some form.	Get better results and less stiffness.	As soon as swelling, etc., begins to subside, 7 to 10 days. *a*	Yes, unless the patient is very old or has rheumatic or gouty diathesis, etc. *c*
54	Louis A. Sayre	Flexed usually	Adjustment of bones equally good, and position more comfortable to patient. *a*	End of second week. *a*	Yes	Pistol shape, or according to Moore of Rochester.	Because it is followed by less deformity.	Early *a*	Yes. *a*
55	W. G. Porter	Flexed	Because I have always done so, and am satisfied with the results obtained. *a*	About tenth day *a*	Yes	Bond's or a simple straight splint.	I think the splint of little importance if the fracture has been thoroughly set and the deformity removed.	About 10th day. *a*	Yes, in simple, uncomplicated cases. *a*
56	C. K. Briddon	Flexed	Can get better apposition with right angled anterior splint. *a*	When the fragments are united. *c*	Yes	After perfect reduction straight anterior splint, padded to fit curvature of radius.	Because back splints produce mischievous pressure.	As soon as painless *a*	Yes, but only after persistent massage *a*

No.	Surgeon.	Humerus.				Radius			
		Do you treat fractures of lower end of humerus of ordinary severity in flexed or extended position?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of joint?	What splint do you use for the ordinary fracture of the lower end of the radius?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of wrist and fingers?
57	Geo. McClellan	Extended	Because of the adjustment.	As soon as the swelling, etc., have been reduced. *a*	Yes	Levis, or flat angular splint with compresses.	The former when there is little deformity; the latter to relax the biceps when there is.	In third week. *a*	Not always; depends upon amount of damage to surrounding parts. *b*
58	Wm. Barton Hopkins	Flexed right angle.	For better adaptation splint; hand does not swell. *c*	Second dressing *a*	Yes	Bond's splint, fingers enclosed in bandage	Keeps its place readily, padded to fit.	Second dressing. *a*	Yes, except in aged and rheumatic. *c*
59	L. S. Pilcher	Both	Depends on comfort of the patient and tendencies to displacement.	Never. *c*	Yes	None.	None required.	After first week. *a*	Yes *a*
60	John Homans	Flexed	Because this position relaxes the muscles and retains the fragments in position, and, if ankylosis occurs, makes a more useful limb. *a*	I use very little. *c*	Yes	At first external and internal splints, broad board, the posterior extending to tips of fingers; later a Bond splint.	To support the hand and wrist and not to squeeze the radius and ulna together.	I use very little. *c*	Yes, but not without deformity. *a*
61	Robert Abbe	Flexed	Because if the fracture is thoroughly reduced under ether it can be best maintained thus. *a*	I use very little passive motion; the patient's voluntary use is superior. *c*	Yes	Nélaton's: two flat and padded splints	Pressure can be graduated and parts watched.	Four weeks. *a*	Uniformly. *a*
62	W. T Bull	At right angle.	It permits easier apposition of fragments. *a*	Three or four weeks. *a*	Yes	Short palmar and dorsal splints.	Simplest form of retentive apparatus.	Three or four days. *a*	Yes, in majority of cases. *a*
63	R. N. Isham	Flexed with inside splint.	To avoid inside deformity of elbow, with ease of position. *a*	As early as fifth day. *a*	Yes	Short palmar and dorsal.	To permit flexion and adduction of hand.	Two weeks, but of fingers at once. *a*	Yes. *a*

64	D. W. Cheever	Flexed	To relax muscles, etc. *a*	Two to three weeks. *a*	Sometimes.	Carr's or Bolle's.	.....	Three to four weeks. *a*	Doubtful. *b*
65	J. A. Comingor	Flexed	In case of ankylosis, arm is more useful. *b*	In ten days. *a*	Yes	Plaster cast.	Avoid stiff wrist and finger joints.	One week wrist, fingers one day. *a*	Yes, have not failed for 15 years. *a*
66	C. B. Nancrede	Flexed	At a right angle or less the (2) axes of arm and forearm coincide and thus save carrying angle. *a*	During third week, but do not believe in it. *a*	Yes	No special one, but always pad, etc., so as to conform to the normal curvature of radius.	.....	Third week, but do not believe in it. *a*	Yes. *a*
67	L. W. Steinbach	Extended	Because it is the natural position.	Three or four weeks. *a*	Yes	Levis.	It conforms to the part in a state of rest.	Three or four weeks. *a*	Yes. *a*
68	H. R. Wharton	Flexed	Because it gives best result if joint function is impaired. *b*	In about three weeks. *a*	Yes	Bond's splint with compresses.	Because I see the best results from this dressing.	Three weeks. *a*	Yes. *a*
69	G. W. Gay	Flexed	Best way as far as I know. *a*	In about ten days. *a*	Fair	Carr's or similar.	Light and convenient.	About two weeks *a*	Fair, except in old rheumatics.
70	R. F. Weir	Flexed	Anatomically correct *a*	Early. *a*	If not primarily involved.	Short plaster of Paris after complete reduction under *ether*	.....	Early. *a*	Yes. *a*
71	A. T. Cabot	Flexed	To prevent posterior displacement. *a*	After three or four weeks. *a*	Yes	Spoon and anterior.	I am accustomed to it.	Three or four weeks. *a*	Yes. *a*
72	F. Hartley	Flexed	Apposition better; dressing does not slip. *a*	Three or four weeks. *a*	Depends on kind of fracture.	Anterior and posterior long splints.	Absolute quiet better secured	Three to four weeks. *a*	Yes. *a*
73	J. H. Packard	Flexed	Because it relaxes the muscles, and obviates deformity, etc. *a*	At once. *a*	That depends.	A small block of wood.	Because it prevents the flexion upward.	At once. *a*	As a general rule yes. *a*
74	Wm. Hunt	Mostly flexed	Better use insured. *b.*	Very moderately two or three weeks. *a*	Yes	Varies, sometimes Bond's.	Reduce well at first and most splints will retain.	Very soon, say ten days? Not severe. *a*	Yes. *a*
75	J. M. Barton	Both	The posit on that keeps them best in place.	After four or five weeks. *b*	Yes	Bond, Levis, or straight.	The one that keeps fragments best in place.	After five weeks. *b*	Yes, and get it four times out of five *a*
76	J. Ashhurst, Jr.	Flexed	Gives better result. *a.*	Third or fourth week. *a*	Yes	Bond's and compresses.	Gives best result.	Second or third week, *a*	Yes. *a*
77	S. Marks	Flexed	Has given better results. *a*	Eighteen to twenty days. *a*	Yes	Hamilton splint.	Gives good results.	Twelve to fifteen days *a*	In the majority of cases. *a*
78	E. H. Gregory	Flexed	Satisfactory results. *a*	Within two weeks. *a*	Yes	Bent at wrist.	Easiest for hand	Within two weeks. *a*	Yes. *a*
79	J. C. Warren	Flexed	To relax muscles. *a*	Early second week. *a*	Yes	Bond's.	Leaves arm in natural position of relaxation.	Second week. *a*	Yes, old people occasionally poor *b*
80	Roswell Park	Extended	To preserve carrying function.	Two weeks(?). *a*	Yes	Have no favorite; prefer plaster-of-Paris.	Because it can be accurately moulded.	Eight to ten days. *a*	Yes. *a*

No.	Surgeon	Humerus. Do you treat fractures of lower end of humerus of ordinary severity in flexed or extended position?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of joint?	Radius. What splint do you use for the ordinary fracture of the lower end of the radius?	Why?	When do you begin passive motion?	Do you usually expect to obtain good use of wrist and fingers?
81	L. M. Tiffany	Not wedded to any position; position varies with the fracture.	No answer given.	No answer given *d*	In youth, yes.	Straight.	Good results follow	Motion never stopped. *c*	Yes (always practically). *a*
82	J. D. Rushmore	Both	To lessen deformity.	After bony union *c*	Yes	Dorsal and palmar to knuckles.	Experience satisfactory.	After bony union *c*	Yes. *a*
83	P. S. Conner	Flexed	Habit. *d*	Six or seven weeks. *b*	Yes	Either strip of adhesive or plaster-of-Paris.	Like it better.	Four to seven weeks. *b*	Yes. *a*
84	T. F. Prewitt	Flexed	My results have always been satisfactory *a*	Seven or eight days. *a*	Yes	Dorsal and palmar, usually.	Readily obtained and results satisfactory.	In a week. *a*	Yes. *a*
85	E. H. Bradford	In either position.	According to the situation of the fracture and extent of the displacement of fragments.	Four weeks. *a*	Yes	Antero-posterior, followed by modified Bond or Carr's splint.	Fixation and prevention of recurring deformity.	Four weeks. *a*	Yes. *a*
86	V. Czerny (Heidelberg)	Flexed	The arm is more useful if ankylosis occur. *b*	In the fourth week. *a*	Yes	Dupuytren splint, Bergmann's or gypsum.	According to circumstances of case.	After twelve to fourteen days. *a*	Yes; in old people and in cases of great comminution the result leaves much to be desired. *c*
87	D. W. Yandell	Flexed	I think I get better approximation of fragments. *a*	Fifteen days. *a*	I do.	Two wooden splints wider than forearm, reaching from elbow to roots of fingers.	To keep fragments in apposition.	Two weeks; often not at all. *a*	I do. *a*
88	W. W. Keen	Flexed	Securesunion in good position; greatest comfort. If ankylosis, the most useful arm. *a*	In third week. *a*	Yes	Levis or plaster.	Retains fragments best.	Two weeks. *a*	Yes; sometimes not, because tendons caught in callus.

Questions similar to those mentioned in the discussion of fractures of the humerus were sent to the Fellows of the American Surgical Association, the Members of the New York Surgical Society, and the Fellows of the Philadelphia Academy of Surgery.

This correspondence elicited replies from 88.

I.

a. The number who frequently treat fractures of the lower end of the radius without any form of splint were	9
b. The number who always use some form of splint were	78
c. The number who made no definite answer to this particular query was	1
Total	88

II.

a. The number who use passive motion within four weeks were	68
b. The number who use passive motion after four weeks were	3
c. The number who do not use passive motion at all were	15
d. The number who made no answer to this query were	2
Total	88

III.

a. The number who usually expect to obtain good use of the wrist and fingers were	69
b. The number who usually expect to obtain good use of the wrist and fingers except in aged, rheumatic, or gouty patients were	13
c. The number doubtful about obtaining good results were	4
d. The number who made no definite answer to this query were	2
Total	88

The same conditions attach to the compilation of this table as are mentioned after the similar table relative to fracture of the humerus on page 27.

DISCUSSION.—Part I.

Dr. John E. Owens, of Chicago.

It requires some fortitude in one who has never treated fractures of the lower end of the humerus in the extended position to come before you to discuss this subject. If we look the world over and consult the various works on surgery with which we are familiar, and study the works of the practitioners of this country, we shall see that the vast majority treat such fractures in a flexed position. The treatment of these injuries in the extended position seems to commend itself: first, because in the extended position there is no room in the olecranon fossa for neoplastic deposit; second, because the superabundant soft tissues, muscular, fibrous, and sero-fibrous, on the front portion of the arm at the elbow are frequently lacerated, and cicatricial contraction is very liable to result; and third, that in the extended position there is no traction made upon the vessels and upon the nerves in making the passive motion which is necessary in many cases. In the extended position the motion is toward flexion of the structures and their relaxation, rather than their elongation. Again, the treatment of these fractures in the extended position preserves the natural angularity between the forearm and the arm. I must, however, confess to a timidity in treating fractures about the elbow, growing out of so many cases of impaired mobility as a result, and so far as I know whether the splints are applied posteriorly, anteriorly, laterally or bi-laterally, or in the extended position. In looking around the room to-day on the Fellows here assembled, I find that almost all sit with their arms at an angle. There is hardly a gentleman whose arm is in the extended position. This is the position of relaxation and of rest, and it is the position which we assume not only in our waking hours but also in sleep. And in the vast majority of cases the forearm is flexed at a right angle. I take it that this is the position of equipoise, the balance between extreme extension and extreme flexion, and for that reason, among others, I have treated such fractures in the way which I thought would secure the most muscular rest and the greatest quiet to the deeper structures.

We may talk as we please about the slight irritation which results from fractures involving the external or internal condyle, or supra-condyloid fracture of the humerus; at the same time there is often much

effusion both within the joint and without it. That no joint in which effusion has taken place can be extended fully, goes without saying. How much it can be extended depends, of course, upon the degree of such disturbance. For this reason the extended position intensifies the traction exerted upon the fragment, whether external or internal, or whether we have a T-fracture or a supra-condyloid fracture, strictly speaking. I have been afraid of the tilting forward of the upper end of the lower piece, or a rotating forward of that piece. Then hyper-extension may be produced by treating the fracture in the extended position, but I should be afraid that it would result in such limitation of flexion as would impair the usefulness of the arm. When we get an arm that cannot be flexed, it is bad. If the arm cannot be flexed, it becomes very inconvenient when the patient begins to be presbyopic.

I expect usually a pretty good result in the treatment of fractures of the lower end of the humerus in the flexed position. I begin the passive motion at the end of four or five weeks, and in my practice the passive motion is carried to the extent short of causing suffering. After you gain the confidence of the patient and assure him that you are not going to disturb him much, you can make a certain degree of movement without creating pain. The results have been satisfactory to myself, and so far as I know, satisfactory to the patient. Unfortunately, I have no specimens to present and no statistics to offer, but my impressions grow out of an experience with the treatment of many fractures during a number of years.

So far as the material used is concerned, I have of late years employed plaster-of-Paris. This is very easily applied and very easily removed if you put it on thin enough. A pair of scissors will cut it down. If put on thickly it becomes a nuisance and there is great difficulty in effecting its removal.

I take it that if you were to look over the statistics in a large number of cases, say one hundred, in which these fractures had been treated in extension, you would find that there was limitation of movement in flexion, and that under the treatment of flexion there might be limitation of movement at the opposite end—that is, in extension. My opinion is that no one can say, in any fracture at the elbow-joint—whether it seems to be a simple fracture of the external or internal condyle or not—that the integrity of the joint is going to be preserved, nor can he promise the patient that it will be preserved. Therefore, I have been brought to treat these injuries at a right angle,

and to increase the movement in the way that I have pointed out — by passive motion.

I am placed in rather a peculiar position and have to be on my guard unless imperfect results bring about litigation, because many of my cases have been railroad cases, where the cupidity of the patient is always excited, and if there is a chance to get money from the corporation or any chance to use the defective treatment of the company's surgeon in the make-up of the plaintiff's case, it is sure to be done. I know of no instance in many years' practice, say twenty-five, where this element in the litigation has been carried out with a successful result. I state that merely to show that I am justified in asserting that the results have been satisfactory to me and to the patient as well as to the corporation.

Dr. John H. Packard, of Philadelphia.

Before speaking on this subject I would like to ask Dr. Roberts two questions. He says in his abstract that fractures of the lower end of the humerus of ordinary severity are as a rule more successfully treated in the extended than in the flexed position. I would ask him upon what number of cases this statement is based.

Dr. Roberts. On no definite number.

Dr. Packard. He also says that old fractures, in which deformity and impairment of function are marked, may within certain limitations be subjected to refracture or osteotomy for the relief of these conditions. Have there been any reports of successful cases of this kind?

Dr. Roberts. I do not know of any.

Dr. Packard. I envy Dr. Roberts the courage with which he approaches fractures about the elbow-joint. In my experience such injuries are often extremely difficult of diagnosis, and baffling in treatment. Swelling comes on very quickly, and obscures everything. Even in prepared specimens the exact nature of the lesion cannot always be made out. "Good results, as regards anatomical conformation and motion, are to be expected, and can usually be maintained." I think if this should go out as the formulated opinion of the American Surgical Association it may do great harm, as affording support to

suits for malpractice. Any one of us might perhaps be confronted with it.

In very thin persons, and where the surgeon is called at once, the lines of fracture can occasionally be traced and accurate coaptation be effected; but even then it is difficult to insure its maintenance.

My own belief is that the "carrying function" is extremely seldom, if ever, completely restored. This angle, salient inward, between the arm and forearm, depends upon the obliquity of the articular extremity of the humerus.

I cannot now remember having ever seen an absolutely perfect result in this respect. It should be borne in mind that this angle varies in different individuals. I believe it is more marked usually in women and children. To demonstrate it in the extended position is easy; but another experiment will show it. If the forearm is strongly flexed upon the arm, the hand will not touch the shoulder unless it is pronated. In supination the angle at the elbow carries it away from the shoulder.

As to the use of lead-water and laudanum in these cases, it seems to me to be about the best available application in the inflammatory stage, and I cannot question the soundness of the practice of putting a damaged joint at perfect ease.

The involvement of the joint, by the fracture running into it, adds materially to the seriousness of the injury. Blood is effused into the synovial cavity, and lymph, as in every case affecting a membrane of this kind, so that adhesions are very apt to form.

Yet I believe, although Dr. Roberts does characterize it as a monumental error, that in the course of a week or so after the occurrence of such an injury, when the swelling has gone down, it is sound practice to make gentle passive motion, grasping the fragments firmly, so as to hold them in place. I always do this, believing that stiffening is thereby prevented, at least in some degree.

When the fracture is just above the joint the carrying function may remain, but it is sometimes impaired. A more frequent result, in my experience, is a limitation of flexion, while exaggerated extension is possible. This is due to the tilting backward of the articular end of the short lower fragment. Upon the occurrence of the breakage the triceps posteriorly draws the olecranon upward, while the biceps and brachialis anticus in front draw the radius upward, and the flexors and pronators pull the upper part of the lower fragment forward. Thus

the two fragments are placed at an angle salient forward, with the result above stated.

To obviate this I have used a splint cut out of binder's board, in the shape shown in the cut. (Fig. 1.)

FIG. 1.

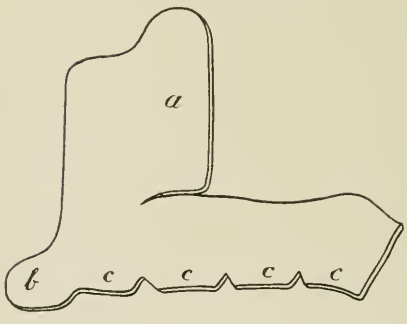
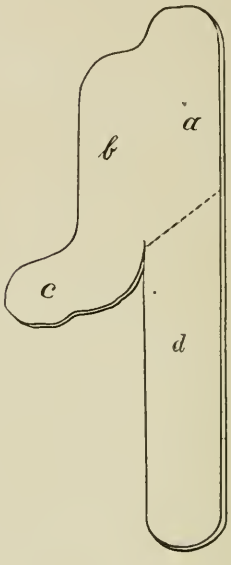


FIG. 2.



This splint is moulded to the inner side of the injured limb, the part marked *a* being bent over so as to come in front of the upper arm, while *b* is brought round behind the olecranon so as to press it forward; the portions marked *c*, *c*, *c*, *c*, are turned up so as to fit along the ulnar edge of the forearm and hand, and to keep them supported. With this plan I have often obtained good results.

Another form of this splint, with which the forearm can be kept in supination, I suggest, but have not yet used it in practice. (Fig. 2.) At the dotted line the two portions *a* and *d* are bent upon one another at a right angle, or nearly so; then the part *a* being placed in front of the upper arm, *b* will fit along its inner side, *c* is made as before to press the olecranon forward, and the forearm and hand are brought up and supported, the palm upward. on the under surface of *d*.

Dr. Charles B. Porter, of Boston.

So much of what occurred to me to say has already been said by the gentlemen who preceded me that it leaves little to be added. It seems to me that Dr. Roberts, in proposing that which is not new, although not universally accepted, overlooks, in the first place, one of the first principles of the treatment of a fracture — that is, to put the muscles in a condition of relaxation. For although in the straight position the triceps is relaxed, the biceps is not. So also the extensors and flexors are put into a state of tension, as soon as the arm is put in the straight position, and tend to carry the lower fragment forward, whether it is a fracture of the lower end of the humerus, a fracture of either condyle, or a T-fracture. It seems to me that in the extended position the muscles, which should be in a state of relaxation and rest, are not, and that with the forearm at a right angle these muscles are most at rest.

I was in hopes that Dr. Roberts was going to give us some actual cases, showing that this method was the better one. I have not seen any statistics in regard to the results of treatment of fractures in the extended position compared with the treatment of such fractures in the flexed position, and until these are forthcoming the profession will be unwilling to accept this as the best method of treatment. As Dr. Owens has mentioned in connection with the medico-legal aspects of the question, we must have first-rate proofs that the new method is the better one before we make such a radical change in our treatment.

Therefore, I should give my adherence to the treatment of fractures at the lower end of the humerus in the flexed position rather than in the extended. I was taught from my infancy in surgery to let injured parts alone, so to speak, and to put them at rest, and I can remember that one of the first principles that the late Dr. J. Henry Bigelow impressed upon his students was that fractures of the elbow-joint should not be pumped. The parts should be kept in a condition of rest until the fracture had united. There was plenty of time for passive motion later. Following that plan I have had very good results in the treatment of fractures at the elbow-joint, and I have taught that passive motion should not be employed until union was complete and the signs of inflammation have disappeared. I believe that fairly good results are obtained by the method of treatment in the flexed position. I think that every fracture should be adjusted under ether, and then not looked at for two or three days, and if found in position not again for a week or ten days. I have seen the criticism made that fragments can-

not be moulded into place. I think that there is something in the skilful tactile sense of the surgeon by which he can tell whether the fragments are well in position or not. If the splints are applied while the fragments are in position and held by proper assistants while the dressings are placed, there is a reasonable hope that everything will go well.

I should take exception to aseptic exploratory incision in recent fractures, where it is difficult to arrange the fragments. So few cases turn out really badly that it is unwise to interfere. In old fractures, where there is sufficient deformity to justify osteotomy, resection of the elbow-joint is better, and by this operation a very valuable arm may be secured.

Dr. J. Ford Thompson, of Washington.

This subject has been very thoroughly discussed, although I doubt whether any very useful deductions in the way of practice have been the result. I think that we shall hesitate as much as before whether we should use extension or flexion. I am thankful to Dr. Roberts for bringing this subject before us. It is a matter of great importance. In my practice it has met me in various ways. I have had to consider the bad effects which have been produced before the patient came to me, and those which I have seen from the beginning. I do not agree with Dr. Packard that a splint made of tin or any solid material at right angles is the best for treating the fractures under consideration. In my opinion, every bad result that I have seen has been in cases treated with such splints. Such splints never bring the fragments into line with a perfect correspondence of the axes of the two fragments. We shall have to adopt some line of treatment by which the axes of the fragments can be maintained during the whole course of treatment. I saw this point demonstrated last winter in two cases of compound fracture. In both cases the tissues were much lacerated and the bones well exposed; in one case I had to wire the ends together, and I placed the forearm in the flexed position, and it was amazing to me to find that it was impossible to maintain the fragments in position by any splint. The result was that I had to put the arm in the extended position and apply a plaster-of-Paris dressing from the shoulder to the hand, and the trouble was over in an instant. The fragments retained their relative position as naturally as could be desired. In a second case, now under treatment, the same difficulty was encountered, and was overcome in the same way. If the diffi-

culty is such as has been illustrated by Dr. Packard I should have less fear from the straight position than from the flexed position. The difficulty about the straight position is that it is disagreeable to the patient and it is uncomfortable. In children I have used plaster-of-Paris with the arm in a more or less flexed position.

I use an internal splint of plaster-of-Paris. I have used felt splint, and if properly applied it is almost as good as plaster-of-Paris. I have an assistant grasp the arm above and below the elbow and make extension in that line, while I apply a splint made of plaster-of-Paris. Nothing will fit so perfectly as this dressing. The splint is left on several weeks. When I treat a fracture in the neighborhood of a joint with a fixed apparatus I take it off within a week. I use no lotion. Absolute fixation of a fracture, especially when in the neighborhood of a joint, is better than any lotion that can be made. When I take the dressing off at the end of a week I take occasion to correct anything that may be out of the way, but I usually find no difficulty. If the limb be found very painful and swollen, which is not usually the case, that is the time to change the position if you are afraid of ankylosis. This can be done without difficulty. The arm may gradually be brought up toward a flexed position, and a splint applied that will fit it. Under this plan of treatment I am happy to say that in the last few years I have been well satisfied with the result of treatment, although it rarely happens that a perfect limb is the result. By this method the results are more favorable than by any other.

As to osteotomy, I have never seen cases where I thought it would accomplish any good, although I have seen almost all the deformities that one is likely to meet with in these injuries.

Dr. A. G. Gerster, of New York.

I believe that this is a subject which deserves eminently the attention of every surgeon on account of its many practical bearings. I think that the conditions involved are exceedingly complex and cannot be classed under one heading, and, on that account, I believe that the assertion that all these cases should be treated in extension or in flexion is doing injustice to the subject. I do not believe that an exclusive treatment by flexion or an exclusive treatment by extension is right. There are cases in which either may be right and cases in which both may be wrong. I wish to refer to only one or two salient points. I mention first that the bad results that we have all observed

and which we will continue to observe after any form of treatment, are due not to one cause and not to the treatment, but to several causes, and especially to one which does not depend on the treatment employed. This cause has been pointed out by Dr. Stimson, of New York. We have had repeatedly an opportunity of inspecting these joints after the bad results have been established. We have cut down and examined the joints, and ascertained the condition which maintained the bad functional results. We have found that the bad results were not due to the treatment, but to exudation and throwing-out of callus where the periosteum has been extensively stripped up at the time of the injury. This may interfere with flexion or extension — most commonly flexion.

Another point which I wish simply to mention is that very frequently bad results follow from insufficient examination of the joint at the time of the injury. As Dr. Porter pointed out, frequently bad results follow because no anæsthesia was employed, and because dislocation accompanying the fracture was not recognized. In these cases it often happens that, crepitus being discovered, the case is regarded as simply one of fracture, while any dislocation that may be present, and which is the most important element of the injury, is overlooked. Cases of fracture where the reduction is easily effected are those in which reformation of the dislocation readily takes place. A small amount of muscular exertion will suffice to reproduce the deformity. This has occurred recently in my own experience. The young surgeon who treated the fracture put it up correctly, and when the patient returned three or four days later it was found that the displacement had been reproduced.

Here we come to the point mentioned by Dr. Thompson, that the treatment of these fractures by any ready-made plan is irrational. The fractures are so different that the method of holding the fragments in place must be determined in each individual case. That position must be adopted in which the fragments can be retained most easily. It is not good surgery to treat every case according to a cut-and-dried method. If the fragments slip out of place in the flexed position, that is not the proper one. If the extended position does not maintain the fragments in place, that is not the correct position. Having tried to treat my cases on this basis, I have found—and this is based upon a pretty large experience—that the maintenance of the fragments in nearly a correct position is more often obtained in the extended than in the flexed position. When the arm is extended you are able to

determine whether or not the fragments are in position. In the flexed position it is often impossible to tell whether or not the fragments are in position on account of the crowding-up of the soft tissues in front of the flexed elbow.

As far as passive motion is concerned, I do not employ any passive motion at all. I believe that passive motion is useless and often harmful. If bony ankylosis is going to take place, no amount of passive motion will prevent it. If the ankylosis is due to fibrous adhesions, these will be broken up by the recurrent active motions carried out by the patient. If there are adhesions of that kind, the patient is encouraged to move his arm actively. The atrophy also will be overcome by the active employment of the muscles, and the adhesions will be gradually stretched and broken down by means that are painless. The passive movements which have been the terror of the patient and of the surgeon may be discontinued. Active movement will accomplish everything that passive motion can.

Dr. S. H. Weeks, of Portland, Maine.

In reference to supra-condyloid fractures it has been my custom always to treat these fractures in the flexed position. I have been much interested in the discussion, and I think that it has been proven that eminent surgeons secure satisfactory results by different methods of treatment. I will simply cite a few authorities in favor of the flexed position and a few in favor of the extended position, showing that not only members of this Association, but surgeons all over the world, differ. Those who use the extended position are Billroth, Lauenstein, König, Allis, Roberts. Among those who use the flexed position are Gross, Bryant, Erichsen, Agnew, Powers, and Ashhurst.

I agree with Dr. Gerster that no fixed rule can be employed. The surgeon must determine in each case whether it is best treated in the flexed or in the extended position.

Dr. T. J. Dunott, of Harrisburg, Pennsylvania.

I notice that in the discussion something has been left out which it may be important to mention. It seems to me that this subject has not been discussed from the standpoint of the manner in which the injury has been received. This usually has a great deal to do with the result, so far as the deformity is concerned. If a child falls and has a separation of the epiphysis, it is easily replaced; but if the

injury is produced by a fall on the elbow so that the bone is split, we cannot expect the same result. The cases which we usually see are not cases of ordinary severity. Most of them occur in laboring men. It is very plain that if you take a fracture at the elbow produced by a railroad accident, where the two sides of the bones are crushed by an immense force, the surgeon could not promise good motion in the joint. I am inclined to think that the flexed position will give a good result in many of these severe injuries. In some cases I have treated the injury by placing the hand on the opposite shoulder. I like to treat the arm in such a position that the radius and ulna are parallel. They are only parallel when the hand is supinated. The moment you rotate the arm you alter the relative angle and relative plane of the two bones. The muscles are more nearly in equilibrium when the forearm is at right angles with the arm than in any other position.

It is often impossible to make any diagnosis with safety in this fracture, because it is impossible to determine the exact condition of the parts on account of the swelling. I think that in the majority of cases the application of the plaster-of-Paris splint gives the best results. I have used this for years. Where I cannot secure this splint I use a perforated tin splint, and have had very excellent results from it. I not long ago treated a case of this character. The man now has three-fourths motion, and the arm is very useful. The injury was received while coupling cars.

Where the fracture is, practically speaking, above the joint, I think that it can be treated with the hand on the opposite shoulder, and, unless the violence has been very great, the joint, as a rule, is not implicated.

In many of these cases where such immense force is applied to the tissues the swelling is so great that no splint can be immediately used. Under such circumstances I employ lead-water and laudanum, lay the arm on a pillow, and wait for some days until the tumefaction goes away. If the tumefaction is so great that the skin is white, and it seems that sloughing is imminent, I invariably make incisions and turn out the clots and put on an antiseptic dressing. The arm is then laid on a pillow and secured to it to prevent any considerable movement when the body is moved.

In the treatment of these cases the surgeon must take into consideration the nature of the injury, the anatomical structure of the joint, the relation of the articular surfaces, and also the fact that the joint itself may be made an instrument in the destruction of its own

integrity. Then we must make a splint to hold in position what we wish to retain, but we must not do it in such a way as to follow blindly any one rule of practice.

Dr. William H. Carmalt, of New Haven, Connecticut.

If I understood Dr. Roberts correctly, he stated definitely that he did not exclude from his paper those fractures of the lower end of the humerus which might involve the elbow-joint. This includes, then, those not altogether uncommon fractures across the lower end which have also a longitudinal fracture extending into the joint, forming a T. If I am in order, therefore, in alluding to this condition, there is a point of some importance not yet mentioned—*i. e.*, the wedging of the ulna into the longitudinal fracture and the consequent separation of the condyles. In this condition there is great difficulty in keeping the ulna out from between the fragments; and I recently adopted a method not yet referred to, which is, I think, recommended by Hamilton, of extension in the flexed position by means of a weight—in the daytime or while walking about or sitting up having the weight hanging down by the side, and when lying down having it carried over a pulley at the side or foot of the bed. It is possible that this practice is not of very wide applicability, but in this case I found it the only means that would keep the ulna from between the fragments. I placed the elbow in a flexed position with a rectangular anterior splint, not bound very firmly to the humerus, but serving on the forearm as a pad to protect against undue pressure, and upon this hung the weight, close up to the bend of the elbow. I am satisfied with the result obtained, and would like to know if this has been often adopted by others.

Dr. J. Collins Warren, of Boston.

I have recognized the difficulty to which Dr. Carmalt referred, but I have interpreted it in a different way. It is not always a sinking-in of the ulna, but frequently a drawing forward of the condyles by the masses of muscles on the inner and outer sides which in a general way take their orgin from these two points. The lower end of the humerus is a fan-like mass of bone, and when there is fracture through this expanded and rather flattened piece of bone the ends are drawn forward by the muscles to which I have referred. It is the wedging-in of these masses of bone between the arm and the forearm which prevents proper

flexion of the arm. The first duty of the surgeon is to immediately put into proper position this displaced fragment, the thumb being placed in the angle, and the fragment so restored to its proper place. Dr. Bigelow laid down the excellent rule that in every fracture at the lower end of the humerus the surgeon should go through the motions of reducing a dislocation of the elbow-joint, by placing the thumb in the angle and extending the forearm on the arm. In this way we avoid the possibility of failing to discover a dislocation, and if the case is one of fracture it enables us to manipulate the fracture into position. For this reason the flexed position is the better one; also, the use of an internal angular splint seems to be of paramount importance. An external angular splint does not control the fragments. The internal angular splint occupies the angle of the elbow and prevents any other mass getting in to stay there permanently. In that way we overcome a great deal of the danger of ankylosis.

Dr. J. Ewing Mears, of Philadelphia.

I think it is very important in the discussion of this subject that the character of the fracture involving the lower end of the humerus should be carefully considered. While Dr. Roberts does not regard the involvement of the elbow-joint by simple lines of fractures as a complication, I think surgeons agree that the results obtained by treatment are influenced greatly by the existence or non-existence of joint implication. In simple supra-condyloid fractures, treatment in the flexed position secures such condition of the anterior and posterior muscles of the arm as is most favorable to the maintenance of apposition and immobility of the fragments. Unless the joint has sustained injury at the time of the bone-fracture little fear need be entertained with regard to ankylosis or the serious impairment of joint function. While modern surgical methods are able to overcome successfully the conditions accompanying joint-ankylosis, it is, nevertheless, the part of wisdom to anticipate its possible occurrence and treat the fracture so that the use of the arm may be partially preserved. Some twenty-five years ago I saw, at the clinic of the late Prof. S. D. Gross, a patient who was suffering from bony ankylosis of the right elbow-joint with the limb in the fully extended position. The left arm had been amputated in the middle of the humerus, thus leaving the patient in a seriously disabled condition, so far as the use of the upper extremities was concerned. In order to carry food to his mouth he used a two-pronged

fork, two feet in length, holding it in his right hand. Using great force Prof. Gross produced refracture and placed the limb in the rectangular position, no attempt being made to prevent ankylosis during the after-treatment. In this position the patient was able subsequently to dispense with the use of the fork in feeding himself. In discussing the case Prof. Gross stated that it was good practice to treat fractures involving the elbow-joint in such position that should ankylosis occur the patient will have a useful limb.

Dr. Porter. Dr. Carmalt has brought forward a point to which I had intended to refer, that is the treatment by weights. Most of the cases are treated with an internal angular splint with a weight. The same plan is employed when the patient is in bed.

Dr. Roswell Park, of Buffalo, New York.

I have seen one case of ankylosis in the extended position. I do not know what the original fracture was. The patient was a girl eight or ten years of age. I resected the elbow. I think that, in as much as most of us are teachers, it would be well to formulate some short rule for students. I think that it is wise, with rare exceptions, to tell the student that he is safer in treating these fractures with the arm in almost an extended position than in any other.

I should like to put in a plea for traction in many of these cases, and especially for the use of the plaster-of-Paris splint. I think it is the best splint of all for these fractures of the arm. I make it of canton flannel, soak it in plaster-of-Paris cream and mould it into position.

Dr. W. E. Taylor, of San Francisco (reported by letter).

About fifteen years ago, a boy aged three years, was brought to me with a fracture of the humerus about the base of the condyle, and also splitting through into the joint. I saw him before there was much swelling, put him under chloroform, and intended to dress it with plaster-of-Paris, in the flexed position, but, do what I would, I could not get the broken bone in good position when the limb was flexed; but in the straight position the fragments easily came in good apposition, and, although it then seemed a little unorthodox, I dressed it with plaster-of-Paris, in this position. I took this off in a week, and reapplied or rather put on a new dressing of the same material. In two weeks, *i. e.*, three weeks from the accident, removed dressing; good

union but a pretty stiff joint. Under chloroform broke up all adhesions and put limb in a sling. Then, once a week for three or four times did the same thing under chloroform, and then several times afterward without chloroform. Result, good arm, with perfect flexion and extension.

A few months later I treated a boy aged twelve years, for compound fracture of lower end of humerus, just above condyles, but not involving the joint. I used the same dressing and straight position. Result excellent in all respects.

About two years ago, a woman aged forty years, with suicidal intent, jumped from a window, and, in addition to fracturing several ribs, sustained a compound fracture of the lower third of humerus and a compound comminuted fracture of the ulna of the same side, extending into the joint. Two or three small fragments were removed, limb put in straight position, dressed with the same dressing—with holes cut over the wound—and a good result was obtained. I am very favorable to the straight position in the class of cases referred to, and while I might not use it in all cases, I would be governed very much by which position, flexed or straight, brought the fragments into the most favorable position; but from my experience, I am inclined to think, for a general rule, that this method should be preferred.

As to passive motion in fractures near or extending into the elbow, but especially in those referred to, I *never* use it until I am satisfied the bones are pretty firmly united, and then, if necessary, use an anæsthetic as often as may be necessary, and get as good or all the motion possible, and keep that amount by repeated efforts, either with or without an anæsthetic. I do not think it common sense or good surgery to attempt passive motion in a few days after one of these fractures, or at any time prior to good union. I do not think the fragments so near the joint can be held sufficiently firm to allow of moving the joint, and besides, one of the rules in a broken bone is to secure immobility of one or more joints, and if Nature assists us, and in addition to our appliances, adds a little more, all the better. I think one great source of stiff or partially stiff elbow joints after the fracture referred to, is want of motion, applied often and sometimes for months, using an anæsthetic or not. Most frequently I have found it to be the fault of the patient, or if a child, of the parents. It is painful, and they prefer to use liniments, quack remedies, etc.

The other question referred to Colles's fracture. I always endeavor to reduce the bone, breaking up impaction and reduce it as any other

fracture. After that I prefer a light plaster-of-Paris dressing extending from the palm to half-way up the forearm, just barely leaving the fingers and thumb free. In some cases I have treated it with straight splints, but never use any made for that purpose. The result depends on many other things than treatment. With good reduction you are pretty sure of a good result, so far as the bone is concerned, and with very little deformity; but with the accident there is almost always more or less injury to the wrist-joint and tendons and ligaments near, which will be followed by more or less inflammatory exudation matting the parts together. Then age is a factor, and many cases have a rheumatic or gouty tendency. So when these things are considered it seems to me that the future utility of the parts is to some extent and in some cases largely dependent upon causes irrespective of any particular treatment.

In the cases treated by me as above indicated I have had very good results, little or no deformity, and in due time, with use, frictions, etc., good use. I cannot say I ever had or saw a perfect result. I think it must be rare.

Dr. Roberts. I can only say that the discussion that has taken place has fully convinced me of the truth of the propositions that I have stated. The gentlemen who admit the worst results seem to be those who use the flexed position. Dr. Gerster's views fully agree with my own. One of the Fellows has said that flexion is the condition of rest, and that, therefore, fractures at the elbow should be treated in the flexed position. The dying man has arms extended, and in sleep the arms are often, if not usually, extended. Perhaps he forgets this, though I think the argument of no value on either side of the present question. We do not want to put all the muscles at rest. We want to put at rest the muscles which are most liable to displace the fragments. Two of the most important of these muscles are the triceps and biceps. In the extended position advocated by me the triceps is relaxed and the biceps is largely relaxed because the forearm is kept supine; and it will be remembered that supination relaxes the biceps very much, for it is a supinator as well as a flexor. I do not care to lay so much stress upon the muscles as upon the bony relations, which are here of chief importance. Traction by weights should be made in appropriate cases, but it is very rarely needed.

I did not say that the extended position should be used exclusively, nor do I say that it is always successful. I said that I believed it to be

the more successful, and that the carrying function was thereby less likely to be impaired. I did not say that the extended position was the most successful always and that the carrying function was never impaired.

In regard to ankylosis, I learned this morning from Dr. Mears that he had operated for unilateral ankylosis of the jaw which had existed for twenty or twenty-five years, and yet the other side was not ankylosed. If the jaw does not become ankylosed when kept immovable for this length of time I see no use for early passive motion in other joints from fear of ankylosis during the treatment of fractures. If synovitis or arthritis exists as a complication, motion will tend to increase this inflammation. If such inflammation is absent stiffness will not occur from rest. I think that plaster-of-Paris is the best dressing, because it can be readily moulded with exact shape of the limb.

I believe that in uncomplicated fractures we can get good results in the ordinary acceptation of the term. Reports from eighty-eight surgeons prove that they get such results. I have not published cases because the number is small. Statistics have been published by Drs. Allis, Fowler, and Powers.

I think that there is a legitimate field for aseptic or antiseptic exploratory surgery of the joint. There is a legitimate use for opening the joint to see that the position of the fragments is good. In certain selected cases it is as legitimate to do this as to make an exploratory incision in abdominal surgery.

DISCUSSION.—Part II.

Dr. Packard. I am much interested in this subject, about which there seems to me to have been much misapprehension. Let me say at the outset, that in 1879 I read before the Surgical Section of the American Medical Association a paper in which I maintained that the chief cause of failure in the treatment of fractures of the radius close to the wrist was non-reduction in the first place.

I have seen many cases treated with Bond's splint, by myself as well as by others, with fair and full application of the principles enunciated by its inventor. They have all had a deformity due to the tilting upward of the lower fragment—a deformity which is inevitable with this splint unless the normal hollow at the lower part of the anterior face of the radius is filled up by means of a compress. One of the most distinguished surgeons in this country fractured his wrist some years ago; he uses Bond's splint in his practice, and was himself treated with it by a gentleman now present. He has to this day, and will have as long as he lives, a deformed wrist.

We all remember the lively discussion which was carried on about the middle of this century as to whether or not there was impaction in these fractures. I feel sure that in the majority of cases there is impaction.

With the idea advocated this morning (I think by Dr. Porter), that reduction should be effected under ether, I heartily concur. We cannot insist too much upon complete reduction as the essential point.

Dr. Roberts seems to me to somewhat underestimate the chance of damage to nerve-cords in these fractures. The usual mechanism of the injury—violent over-extension of the wrist—necessarily involves an extreme strain upon the tendons and their sheaths, and with them upon the nerves at the front of the wrist. In cases where reduction has been imperfectly or not at all accomplished, the pressure of the broken edge of the bone may be a factor in causing or in keeping up nerve-irritation.

I cannot but object to Dr. Roberts' proposition that "the ordinary fracture of the lower end of the radius usually requires no splint, and should be dressed with a wristlet of adhesive plaster or bandage." I do not think we can trust always or altogether to such means for the support of the parts.

For a number of years past I have employed a slip of wood cut so as just to fit into and fill up the normal hollow at the lower and anterior part of the radius; I make it just as wide as the forearm, and long enough to reach from the root of the thumb to the swell of the muscles, shaving it off to a thin edge at its ulnar margin. The fracture being reduced, this little splint is applied and secured with adhesive plaster and a bandage; it cannot slip either upward or downward. While this plan leaves the fingers free, it gives abundant support in most cases. But more rigid confinement is sometimes needed to prevent recurrence of the deformity, as in many of the young toughs who come to dispensaries and hospitals for treatment. Here, I think, Dr. Roberts's back-splint may be added with advantage.

I have never seen a case where an old fracture of this kind could be benefited by forcible rebreaking. Even when the deformity is very marked, function is generally regained. If the trouble is the damage to the nerves, relief cannot be looked for from any such procedure.

Dr. Porter. In the treatment of fractures of the lower end of the radius I should like to say with more emphasis than I did this morning, that I consider that complete anæsthesia is the first thing to be obtained. The complete reduction of the impaction is the second. In thinking this subject over, it seemed to be almost absurd to bring here the splints to show my method of treating ordinary fracture of the lower end of the radius, but there has been so much difference of opinion expressed as to the kind of splint, that I am glad to have the opportunity to show my plan of treating these cases. First anæsthesia, and second reduction of the impaction; and I think that impaction occurs in more cases than is usually supposed. The reason that we have deformity is that this is not sufficiently broken up. While an assistant holds the arm I break up the impaction and free the ends of the bone. Then, while the arm is held firmly the posterior splint is applied. Then the anterior splint with a small pad at the ball of the thumb is applied. This has been to me the most successful method of treating fractures at the lower end of the radius. Dragging on the lower fragment by pulling on the thumb brings the parts into position, and the adhesive plaster holds the splints in place.

The fracture should be watched on account of the danger of swelling, and the bandage loosened if required. In a few days I generally take off the most of the hand part of the splint. With the anterior splint applied there is generally more or less motion at the wrist-joint. As

soon as union is firm I shorten the back splint still more and allow of wrist motion. I allow the hand out at the end of a week or ten days with motion of the fingers, and at the end of two weeks motion at the wrist joint. I should certainly give my vote against relying upon a simple wristlet of adhesive plaster as a proper method of treating Colles's fracture. I have never treated my cases in that way, and cannot say that it is not sufficient, but it does not appeal to me. If deformity followed such treatment I think that we should lay ourselves open to suits for malpractice.

I think that here, as at the elbow, passive motion is unnecessary, and that only in old people or where there is a rheumatic or gouty tendency passive motion may be of value. In these cases after union is complete, I advise hot baths for twenty minutes or half an hour with friction of the parts afterward.

I have had but one experience with the breaking up of old deformity after Colles's fracture. This was in a young man at the end of six weeks. I succeeded in breaking up the fracture and in getting a pretty uniform bone, but there was great relaxation as a result of the traction made. This was before the osteoclast was known, and a different method of applying the force might have resulted better. I have had no experience with osteotomy. I may sum up by saying that my method in the treatment of Colles's fracture is first anæsthesia; second, breaking up of the impaction and then the application of an anterior and posterior splint, and allowing at the end of a week or ten days motion at the fingers, and in two weeks motion at the wrist.

Dr. Thompson. Very early in my professional life I was struck by the fact that I was consulted very commonly for deformities and useless hands following Colles's fracture. I have usually found upon investigation that these fractures have been treated with the two long splints which confine the fingers as well as the wrist, and that the splints have been left on for several weeks without any examination or any motion whatever of these parts. I would say that in Washington I see many distressing cases, for there are many women employed in the various departments, and it is astonishing the number of cases I see in women whose livelihood depends upon the proper use of both hands. My attention was early drawn to this fact. I was surprised at the number of disabled hands that result from the ordinary plan of treatment, and frequently these bad results follow in the practice of men with some surgical reputation. I came to the conclusion that

the treatment was overdone in these cases; that is to say, the surgeons were in the habit of treating Colles's fracture as they treated fracture of the forearm higher up. Where I have observed that treatment the results have been bad. I have tried many forms of ready-made splints, and have abandoned them all. I think that Gordon's splint, if used by an experienced surgeon, will meet the indications better than any other. I never used Bond's splint, because I saw some bad results which it had produced. I have abandoned all the ordinary splints. When I meet with such a fracture I ask for a small piece of board—a portion of a cigar-box. From this I make two splints, with proper padding. These extend from the middle of the forearm to the palm. They are applied after thorough reduction, and I must admit that I have not found it necessary very commonly to administer an anæsthetic. This question of impaction is a very interesting one. Some think that it is always present, while others consider it very uncommon. I think that in the vast majority of cases impaction is absent; that is, reduction is easy without an anæsthetic. In a case seen a few weeks ago, in a woman who had fallen from a window, and who had a bad fracture, I was compelled to administer an anæsthetic, which I never hesitate to do when there is any difficulty. When reduction has been perfectly accomplished, the after-treatment should be easy. These two short splints, which are not very different from those recommended by Hamilton, answer admirably. In treating all surgical conditions it is desirable as far as possible to reach simplicity. This is especially important for the younger men. I would say that for years I have not had a result that has given me any trouble, and most of the cases have been treated in the way mentioned with the exception of two, where I resorted to a plan of treatment not yet mentioned. An eminent physician of our city was thrown from his carriage down an embankment, over a year ago, and sustained a Colles's fracture. I applied the ordinary splint, and his suffering was severe. I then used plaster-of-Paris, an assistant making traction after reduction, the hand being well drawn to the ulna side. The relief was instantaneous.

I allowed the dressing to remain for a week, and then I treated the case in the ordinary way, with two short splints. In the woman to whom I referred a few moments ago, the same difficulty occurred. She tore off all the dressings that I put on. When I reached the house the next morning I was told that she had torn off the dressing several times, and that the mistress had reapplied it. I substituted the

plaster-of-Paris, which gave great relief. I took it off at the end of a week, and used the short splints, with a result that is absolutely perfect.

I do not believe in the theory advocated by Dr. Roberts; that is, no treatment whatever. I have come to this conclusion from my own experience. I have seen a number of cases of Colles's fracture where this plan was followed unintentionally; that is, where a false diagnosis has been made. The supposed dislocation is reduced, and nothing is done. I had such a case two weeks after the occurrence of the fracture. It had been reduced, but the patient suffered considerably. As soon as the ordinary dressing was applied instantaneous relief was afforded. I have seen nothing that would go to show that we should adopt this practice. My opinion is that with a splint applied not for the purpose of reducing deformity, and not with the pressure that is ordinarily made in treating fracture of other parts, but simply as a support, with freedom to the hand, we have all that is required.

In regard to those cases in which we are consulted after the damage has already been done. I have had several such cases in the last month or two. Two or three months after the fracture people come to my office and want to know if anything can be done. There was one woman whom I put under chloroform about twenty times, and broke up what I supposed to be adhesions. The fingers were stiff, and apparently I would break up the adhesions, and yet in one week they would be as bad as before. In another case this winter I did it about a dozen times. Both of these patients went out of my hands but little improved. It is a question what can be done. A few weeks ago a gentleman with Colles's fracture came with his wife. After dressing the fracture, he asked me to look at his wife. Both wrists had been fractured. One had been broken twelve years ago, and was treated by a surgeon in Washington. The hand was practically useless. The other was broken two years ago, and was treated by another surgeon. The man was treated in the usual way, and never lost a day from duty. He used his fingers during the whole course of treatment, and the result is perfect.

We want to learn not to do too much. If we fail to reduce these fractures that are impacted, and then put on a splint that is too tight, the result is inflammation of the sheaths of the tendons, and the hand is ruined for life. In many of these cases there is in the course of time considerable improvement, and perhaps cure.

Dr. Joseph Ransohoff, of Cincinnati.

In some of these cases the bad results are due to the use of the splint for too long a time. In many cases that I have seen the dressing has been applied and retained for five or six weeks. The surgeon would then remove it, and finding union not perfect would reapply it and allow it to remain.

There seems to be a consensus of opinion here that reduction is the *sine qua non*. In many cases, however, there is no deformity. Then there are many cases that cannot be reduced in the simple way shown us by Dr. Porter. I think that I have had three or four cases where extension would not overcome the overriding of the lower fragment. In such cases the value of hyper-extension has not been sufficiently insisted upon. Of the two methods, simple extension followed by flexion and hyper-extension, I should select the latter if I had to choose between the two.

I have thought that the want of usefulness of the wrist was largely due to want of reduction and to keeping the hand fixed in the splint. I have dreaded too keep the wrist fixed too long. I never use a splint extending beyond the fingers. I am partial to the Levis splint. After a week or ten days I resort to passive motion, and by firmly grasping the forearm this can be done without detriment to the fragments.

I have in one case only had an opportunity to make an osteotomy for old unreduced fracture. This was eighteen months after the injury. Flexion and extension, and particularly abduction and adduction, were interfered with. I was surprised to see how much like a recent fracture the lower end of the radius looked. After the osteotomy was done through the line of fracture reduction was easily accomplished. The result was somewhat beneficial.

Dr. Charles B. Nancrede, of Ann Arbor, Michigan.

I should like to say a word on a bugbear introduced here, which is the risk incurred by the profession by statements that we make. I do not think that we carry as much weight as we should, and less than we are inclned to think. I think that the truth had better be said.

I have been forcibly struck by two or three things. We talk as though perfect reduction were always an easy matter, and that if it is made we can maintain it. I deny that positively. When the lower end of the radius is broken a certain amount of bone tissue is sometimes destroyed, and although you may return the fragments to the best possible position, there will remain some deformity. If you keep

a proper retentive dressing on, the gap may be partly filled in by callus, and there will be less deformity. Reduction is the most important measure, but in the majority of cases can only be accomplished by the most forcible attempts. Then in certain cases you will find by comparison with the other radius that you have restored the normal under curve of the bone, but as soon as you let go the deformity will be reproduced. It is bound to be reproduced by the condensing of the bone, which has occurred in these cases. Recognizing that we have to treat a curved bone instead of a straight bone, the discussion of to-day is unnecessary. All that you have to do is to recognize that the under surface of the radius is curved, and make your splint to conform to the normal shape radius, so that if by any possibility there is actual loss of tissue there will be a less degree of deformity when the bone unites. Every kind of apparatus is useful when this indication is carried out.

There is reason to believe that Bond's splint has been made to bear odium that it does not deserve, especially as the compresses, which are an essential part of the dressing, really convert the splint into a *curved* one, fitting the under surface of the radius. I treated the fracture to which Dr. Packard has referred. It was not the splint that was responsible for the result. The gentleman who was the patient absolutely declined to permit me to thoroughly reduce the fracture. He said: "It is useless, and the compresses will reduce it." I never expected to reduce it with the compresses. The functional result is very good. He did a hare-lip and some operations six weeks after the accident.

In regard to constrained positions and forcing the hand to the ulnar side, I can only say that as the projection of the head of the ulnar is caused by rupture of ligaments, allowing of displacement of the bone, such positions can have but little useful effect.

Passive motion is more than useless. Twenty-two years ago a patient who had fractured both wrists, and who had been treated in another hospital, came to the one in which I was an interne. I was directed to use forcible motion every other morning, but instead of getting better he got worse. Three years afterward I met him. He was then able to make his living by opening oysters, an occupation in which a good deal of wrist motion is required. After leaving the hospital he had done nothing.

If we recognize that there is sometimes impaction and actual destruction of osseous tissue, that the bone is a curved one, and that every

apparatus which conforms to the shape of the radius will keep it in place, that perfect reduction is possible only when much impaction and crushing has not taken place, we shall be best able to treat these fractures. I am inclined to think that we need not be afraid to say that reduction is *essential*, but this should be qualified by the statement that after securing perfect reduction we cannot always *maintain it*, because there has been destruction by condensation of both tissues. We should use any kind of apparatus that fulfils the indications, making the splint conform to the form of the radius of the other side.

Dr. Packard. I would say that if Dr. Nancrede can give conclusive proof that there is loss of tissue at the posterior part of the bone he should feel bound to do so, as this has been one of the most disputed questions in regard to these fractures.

Dr. Mears. Barton's fracture and Bond's splints are closely associated with the history of surgery in Philadelphia. Barton's fracture, which consists in the splitting off of the posterior lip of the articulating surface of the radius, was described by Rhea Barton in 1838. Its occurrence is rare—so rare, indeed, that its existence has been doubted—yet there are well-authenticated specimens showing the lesion in the museum collections of Philadelphia. I have seen a well-marked instance in a lad of eighteen years, who sustained the injury from a fall through a hatchway, from a height of four stories. Usually the displacement of the fragment is not great; in this case, however, the fragment, which was distinctly triangular in shape, occupied a position three inches above the articulation. Colles's fracture was described by Mr. Colles, in 1814, as occurring at a point one inch and a half above the joint; and Smith's fracture was described as a fracture of the bone three-quarters of an inch above the articulating surface—both are, therefore, extra-articular.

Bond's splint was devised by Dr. Henry Bond, of Philadelphia, and was described by him in a paper on fractures of the lower end of the radius, read before the College of Physicians of Philadelphia, in December, 1851. After the directions for making the splint, he states that the requisites for dressing a fracture with it are "soft fabrics to line the inside—two compresses," on the formation of which and their proper adjustment he lays particular stress: "A roller, and sometimes, but not always, a dorsal splint." He also gives instructions with regard to reduction of the fragments by traction and manipulation. The shape of the splint fulfils the indications for treatment by overcoming

Sponge from which
ether was inhaled
in the Mass. Gen. Hospital

the abduction of the hand, the tendency to displacement to the radial side, secures freedom of the fingers for motion, and gives comfort to the patient. Dr. Packard will, I am confident, bear me out in the statement, that in fractures of the lower end of the radius of serious character, in Philadelphia the surgeon frequently does not dismiss the case as entirely relieved under eight to ten weeks. The manipulations after removal of the dressings, so necessary to the restoration of complete function, require very often this length of time. The surgeon who derives his experience chiefly from public hospital cases rarely sees the patient after bone-union has occurred, the patient being transferred to the out-patient service, where the treatment is completed by the interne or out-patient surgeon.

Dr. Roberts. The paper of Dr. Packard which he mentions is one from which I have learned much. I think that the chief interest pertaining to the so-called Barton's fracture is that it probably never exists. Bond's splint is of interest because it has done, and still is doing, a great deal of harm. It would be well if every Bond splint was burned. A great deal of trouble comes from the way that it is often applied. Those who understand the management of fractures of the lower end of the radius may use Bond's splint without harm, because they pad it until it is no longer Bond's splint.

I have tabulated, as stated in my paper, forty-eight consecutive cases of fracture of the radial base seen by me in three months. Out of that number I had to reduce six after the treatment had been begun and splints had been applied by other practitioners. These cases were all in the out-patient department of a large Philadelphia hospital. This shows that we must teach young and old that immediate reduction is the proper thing. I would not treat a man who would not permit me to reduce the fracture. I think that an anæsthetic is not usually needed. If reduction is done at once there is, as a rule, no trouble. You give pain for an instant only, and the work is accomplished.

Speaking of the seriousness of some of these fractures, I have reported the case of an imbecile woman, aged about seventy years, who fell some distance, breaking both radii. I reduced the fragments and applied splints, but she pulled off all dressings. There was considerable deformity from the great comminution, but she had perfect use of the wrists and fingers, showing that if the fracture is reduced and not tied up too long you will get good motion. I use occasionally a straight splint applied on the back of the wrist, where the radius is practically

straight and without the curve or arch seen on the palmar aspect. I believe with Dr. Nancrede that there is often absolute loss of substance. There is crushing which destroys the structure of the bone, and the small particles are subsequently, in all probability, absorbed.

I do not, as some seem to think, allow the patient to go without treatment. I believe that reduction is the important element and practically all the treatment needed in the average case.

I was astonished to hear Dr. Mears say that a fracture at the lower end of the radius required eight to ten weeks for its treatment. I saw yesterday a woman who has been under treatment three weeks. She had a splint for three days, put on by my assistant. I removed the splint and put on a wristlet of adhesive plaster. Yesterday I told her that she was well. You need not rub and pull the fingers for four or five weeks. The splint can be removed in ten days or two weeks.

Dr. Packard thinks that refracture does not give good results. I differ with him, though, of course, the results are inferior to those obtained after immediate reduction. I have refractured one broken radius as late as eight weeks, and I have reduced perhaps a dozen cases at the end of three or four days. I call that, however, late reduction rather than refracture. At eight weeks I believe that refracture can ordinarily be done. Some of the books state that reduction is accomplished by gentle movements. This is erroneous teaching, I think. We must apply as much force as is necessary. If there is no other way hyper-extension is to be resorted to.

I would, in conclusion, offer the following propositions:

1. That the most important detail in the treatment of the ordinary fracture at the lower end of the radius, which is ordinarily called Colles's fracture, is immediate and complete reduction of the lower fragment.

2. That this reduction should always be complete before the application of any form of splint, even if anæsthesia is necessary to make the medical attendant certain of the accomplishment of this reduction.

Dr. Packard. I hope that I shall not be put on record as saying that no splint is required. I believe that refracture is an exceedingly difficult thing to do in connection with the wrist, because there is scarcely any purchase on the lower end fragment. I doubt whether refracture is ever accomplished in such a case. I think that these cases should be classed with the others which Dr. Roberts has spoken of as late reductions.

FIBROID TUMORS OF THE UTERUS.

By JOHN HOMANS, M.D.,
BOSTON, MASS.

My paper is not, in any sense of the word, a treatise or an essay on fibroid tumors, but simply an account of their natural history as I have watched them, their effect on the women who have had them, the means that may be employed when necessary to remove them, and the condition in which patients are left after operation. Nor have I thought it necessary to enumerate and tabulate all my own cases, although this might be interesting to the Association and instructive to me, but I have simply illustrated my remarks by citing a few descriptions applicable to the subject mentioned. If in concentrating what I have to say I have not carried out the wishes of the committee I shall regret it.

I suppose it is unnecessary for me to define a fibroid tumor of the uterus. We all know them to be aggregations of normal uterine tissues in abnormal situations and masses. They may cause symmetrical enlargements of the uterus, or more or less one-sided enlargements; or they may be composed of many lobes; they may be in the walls of the uterus, or protruding toward its outside or toward its inner cavity; they may be incorporated with the uterus or connected with it by a broad attachment, or by a pedicle, or they may be entirely separated from it and get their nourishment from the vessels of the omentum or mesentery, to which they are adherent; they may grow under the broad ligament, or they may grow directly out into the general cavity of the peritoneum. Certain of them that grow near the cornu of the uterus are sometimes gradually extruded until they are merely connected with the uterus by the

Fallopian tube and broad ligament and have a pedicle as distinct as that of an ovarian pedicle. I have seen this state of things three times, and always on the right side. They may be dense, or œdematous, or filled with lymph-spaces, or they may, in very rare instances, be fibro-cystic, having true cysts as distinct as those in an ovarian tumor, not the dilatations I have mentioned above in the substance of the tumor, which are filled with clear yellow or bloody fluid, and are simply dilated lymph-spaces, but fibroid tumors, having true cysts on their outer surface, with thin walls, and filled with fluid of different densities. I am of the opinion that a certain number of tumors which have been described as fibro-cystic belong to the class I have mentioned as fibroids with dilated lymph-spaces. True fibro-cysts are clinically very rare, though histologically all uterine fibroid-cysts may originate as dilated lymph-spaces. I should say a frequent operator would not meet with more than one or two in many hundred cases of uterine tumors.

In size these tumors vary from that of a mere dot to tumors weighing fifty or more pounds. Their rate of growth is generally slow, by which I mean that several years' growth will be required to produce a tumor the size of one's fist. They are very common. In order to settle this question for myself I have gone over my records of office patients. I find that I have seen in my office during the past fifteen years three hundred and seventy cases of fibroid tumors of the uterus, and, as I have seen many at the hospital and in consultation, I think I may fairly add one hundred and fifty more, making in all five hundred and twenty cases. When one surgeon has seen that number in fifteen years I think they may be called common.

These tumors are said to occur more frequently in the black than in the white race, while ovarian tumors are said to be more common in the whites than in the blacks.

Operations to relieve women of fibroid tumors are rarely necessary, judging from my own experience. Of these five hundred and twenty cases, I have operated only on sixty, or about eleven per cent. The conditions which should guide us in recommending removal of the tumors are, when they threaten

life by hemorrhage; when they are unbearable from their weight or from the inconvenience they cause, particularly in the act of stooping or bending, or from their position when they prevent a woman from sitting down; when in a young woman they cause distress, chagrin, and shame from the alteration they have made in her figure; when they cause so much pain as to make life a burden; when by their presence they so obstruct the circulation as to cause swelling and œdema of the limbs, or interfere so much with the action of the digestive and eliminative organs as to cause emaciation and weakness; when they block up the pelvis so as to cause obstruction of the bowels; or when they have cause strangulation of the bowels; or when their pedicles have become twisted, and sometimes the whole uterus becomes twisted on its axis exactly as the pedicle of an ovarian tumor does, and presents the same symptoms, and requires immediate operation.

Death by hemorrhage is very rare; I have only known of three instances. Many women are blanched and anæmic, and feeble, but they live, and most of them are relieved by curetting, or at times by electrolysis *à la* Apostoli, or by the removal of a pediculated fibroid from the interior of the uterus, or by enucleating a half-extruded one.

The feeling of weight and inconvenience caused by these tumors is sufficient in some cases to call for their removal, and the sufferer has a right to demand operation even if life is not threatened, for surgery is not only to save life but to contribute to its comfort, and there is no class of cases in which the decision of the patient has more weight than in these cases of fibroid tumors. "I do not want to carry this thing any longer; it annoys me. I cannot stoop to button my boots, and I want it removed," said a woman to me. I had put her off several months, and she had had abundant time to think the matter over. I thought she had a right to decide the question of operation. I removed the tumor, and she got well.

A growing tumor in a young woman from fifteen to thirty years old, which has distended the abdomen and is prominent and unsightly, and causes remarks, may be, with propriety,

removed, if the sufferer cannot bear to know how she looks, even if the tumor gives rise to no symptoms. It is *her* tumor and *her* life, and her body and appearance, and she has a right to look like other women if she wants to.

Some large tumors interfere very little with respiration and nutrition, and cause but little œdema and emaciation, while others not so large cause great debility. Those tumors which have separated themselves entirely from the uterus are dangerous from the opportunities they afford for strangulation of the intestines, and should be removed. I have seen a case of death caused by some loops of the bowel becoming strangulated by slipping in between points of adhesion formed between a fibroid which had become wholly separated from the uterus and other loops, in a tumor nourished solely by its adventitious adhesions. Such loose-lying fibroids should be removed.

Again, a fibroid may threaten to render delivery impossible by the natural passages. At the same time, Nature will generally get these fibroids out of the way if you will give her a chance. I remember a case of this kind in the practice of Dr. John Benson, of Chatham, New Brunswick. It was a first labor; the tumor was so obstructive that Cæsarean section was seriously considered, but at length the tumor receded and allowed the head to pass. A few weeks after delivery Dr. Benson sent the lady to me. I opened the abdomen, turned the body of the uterus and both ovaries forward upon the pubes, split the capsule of the tumor and enucleated it from its bed, sewing up the rent in the uterus where its pedicle had arisen from the posterior part of the body near its junction with the neck. Recovery was uneventful. The tumor was about six inches in diameter and weighed two and a half pounds; it was growing, and if it had been allowed to remain would undoubtedly have rendered the next delivery impossible.

At the same time, as I have said, Nature will generally lift these tumors out of the way when the attending accoucheur would think natural delivery impossible. I remember a case where a large fibroid filled the vagina at the beginning, or just before the beginning of labor. I could not move it when pressing on it

with my hand, even with a purchase against the wall of the room with my foot, and yet in twenty-four hours Nature had pulled that tumor up and had pushed the os, through which one could feel the child's head, down into the vagina.

I remember another case of pregnancy at five months, where I advised non-interference, but another gentleman said the tumor must be removed, as delivery at term would be impossible. This was done, and the woman died in two hours. Another case I remember where a practitioner produced labor somewhat prematurely and ruptured the uterus, and the woman died. Both of these cases could not have done worse if they had been let alone, and they might have done better.

Sometimes these tumors, when quite small, by their position make it impossible for a woman to sit down with comfort. One of my patients said she felt as if she was sitting on a spool, and that she had to stand or lie down to have any comfort. She was sent to me by Dr W. G. Kimball, of Worthington, Mass. A fibroid about the size of a horse-chestnut, on the posterior and left side of the fundus, was tied and burnt off. Another near it, the size of a boy's marble, was torn off. There was no drainage. Rapid recovery and complete relief followed.

The solid fibroid tumors rarely have any adhesions, and are removed without much difficulty after a little practice. The true fibro-cystic tumors are very rare. By a fibro-cystic tumor I mean one whose outer surface is covered with cysts, having rather thin walls, and not those tumors whose outer surface is smooth, but whose interior contains dilated lymph-spaces. Perhaps, anatomically, they all originate alike, but clinically they differ. In the five hundred and twenty cases mentioned above I am only sure that eight were fibro-cystic, only about 1.3 per cent. Of these I did not remove any successfully. In all the operations I was unable to separate the cysts from the bowels and other peritoneal structures. One woman recovered from an incomplete operation. The others all died. Of course, there may have been a cancerous element in some of these tumors, as very few of them were followed by an autopsy. Most of these operations were attempted many years ago,

when my manual dexterity was not as much developed as it is to-day. But I still regard what I call true fibro-cysts of the uterus as very rare, and, as a rule, very dangerous in their removal.

An extraordinary case of twisting of the uterus as the pedicle of a large fibroid tumor of many years' existence was reported by me in the *American Journal of Obstetrics*, vol. xxv., No. 3, 1892. The uterus was twisted one and one-half times on its axis, and the blood supply was cut off from the tumor and from the ovaries and tubes. The case was fatal, no operation having been done. There was general peritonitis and lobular pneumonia. How this twisting of a solid tumor and of the uterus could have happened is incomprehensible to me. Here was a solid fibroid tumor, weighing at least six pounds, and, with both ovaries, tubes and broad ligaments, it had twisted itself or been twisted one and a half times.

The natural history of ninety per cent. of fibroid tumors is to grow to a size to reach the umbilicus, or to reach higher or lower than this point, and then to remain stationary, and after the menopause to become cretaceous and atrophied. Some of them, I think, shrivel up almost entirely, while others remain as large as a cocoanut without giving rise to great inconvenience. About ten per cent. of them require removal for one of the various reasons I have mentioned in the earlier part of this paper; others atrophy of themselves, without any treatment being employed. A large number of them are discovered by an attending physician, the women being totally unaware of their presence, though they have been in the womb for many years.

Patients with fibroid tumors present themselves between the ages of twenty and sixty, rarely before or after these periods of life. I find that the average age of those on whom I have found it necessary to operate is thirty-nine years. One-quarter of them were about thirty-four years old. My youngest patient on whom I have done abdominal hysterectomy for a fibroid was eighteen, and my oldest sixty-five. Of sixty cases, one was sixty-five, one sixty-three, ten were between fifty and fifty-two,

one was eighteen; only three were between twenty and thirty, while forty-four were between thirty and fifty years of age.

The treatment by these cases may be by drugs or by surgery, or by both, or by letting alone. The most common drug used is ergot. Alone, as a rule, it is ineffectual; combined with curetting it helps to stop hemorrhage. The treatment by high doses of electricity sent through the uterus and tumor *à la* Apostoli, I have written upon at length elsewhere (*Boston Med. and Surg. Journ.*, vol. cxxiv., March, 1891). Suffice it to say that it sometimes arrests hemorrhage, almost always relieves pain and gives strength, but rarely diminishes the size of the tumor.

Removal of the ovaries for the cure of fibroids, particularly bleeding ones, was at one time extensively practised. I have practised it but four times. In one woman forty-four years old the tumor disappeared in a few weeks and menstruation ceased at once. In another, thirty-three years old, the catamenia gradually ceased after three years, and the tumor remained about the same, when I last heard, in 1887. In another woman, thirty-four years old, the operation was done on August 5, 1885. By May, 1886, she had gained twenty-four pounds in weight, and was well and strong. From the time of the operation till November 10, 1885, a period of three months, she flowed incessantly, but only slightly, nothing in amount to what she had done before the removal of the ovaries and tubes. From November 16, 1885, till February 24, 1886, the flowing wholly ceased. Since that time, till May 13, 1886, she flowed continually, but not one-tenth as much as she used to. The tumor was somewhat diminished. I have not seen her for six years.

Another one, thirty-six years old, was not at all relieved by the operation. The tumor reached to the umbilicus, and the flooding was severe. I removed the ovaries and tubes on January 21, 1886. Two years later the tumor had descended into the cavity of the uterus, and was removed *per vaginam*. Of course, after this the hemorrhage ceased. I have seen in another case, not my own, the tumor grow enormously after removal of the appendages, and I am inclined to regard the method as unreliable.

Curetting the interior of the uterus often cures the hemorrhage completely, and this curetting I follow by wiping the interior of the uterus with tincture of iodine. At the present time the surgical treatment is almost wholly by removal of the tumor, with or without the uterus. The kind of operation to be adopted has and will vary with the particular case and the particular operator. In general, the two varieties of the operation are described as intra- or extra-peritoneal treatment of the pedicle. Of course, if the tumor has gradually been extruded more or less into the cavity of the uterus, it should be enucleated and removed under the most careful antisepsis. Such protrusion will invariably be preceded by great hemorrhage, and will give abundant warning of the necessity of interference. Quite large tumors are extruded in this way.

Tumors which have carried the fundus of the uterus to the umbilicus may in the course of two or three years be removed *per vaginam*. But tumors requiring removal, which do not thus become extruded, must be removed by abdominal section. There are several ways of finishing this operation. Sometimes one can close the wound in the uterus by stitches and leave no pedicle, but simply a sutured wound, and then close the abdominal wound. Sometimes the base of the tumor and body or neck of the uterus are compressed in a small écraseur or serre-nœud, and a long pin passed through the stump holds it outside the skin of the abdomen; this is called the extra-peritoneal treatment of the pedicle by Koeberlé's serre-nœud or some modification of that instrument. Sometimes the stump is simply tied around as the pedicle of an ovarian tumor is, and is dropped back. Sometimes the stump is turned into the vagina after being ligatured; this is called the intra-vaginal treatment of the stump, and is of course extra-peritoneal. All the different modes of treatment depend for their fundamental success on asepsis and on securing the vessels of the broad ligament, no matter in what way the pedicle or neck or body of the uterus is ultimately disposed of. I will not enumerate the different methods. The members of the Association are referred to ingenious methods of operation described in the

American Journal of Obstetrics, particularly in the contributions from Chicago during the past few years, and to the foreign journals, particularly the German ones. Time would fail me and this introductory paper would become a monograph on the different operations for removing fibroid tumors of the uterus by abdominal section if I should describe the different procedures employed.

The condition of most of those from whom fibroid tumors have been successfully removed by laparotomy is very comfortable. Some of them, I do not know exactly what proportion, suffer from what they call "hot flashes," by which they mean a sensation of heat rushing to their heads. This is extremely uncomfortable. In some cases it takes place every few minutes, in others at longer intervals. I do not know any way of relieving this distressing symptom. Others get extremely fat. A certain proportion, particularly those in whom the pedicle has been treated extra-peritoneally, suffer from ventral hernia. In all cases, however, in which the operation was really necessary the state of health is much ameliorated, and the individual is very comfortable.

Sometimes the bladder is cut off by the wire écraseur, owing to its not having been sufficiently dissected off from the tumor, but in the only case occurring to me the bladder healed in a few weeks by keeping it drained with a Sims's catheter, and the accident has caused no subsequent trouble, the bladder having been perfectly normal ever since the operation, some ten years ago.

The length of the incision does not complicate an operation, provided there are no adhesions. I remember one extending from the sternum to the pubes, in which a tumor weighing fifty-three pounds was removed. The scar has remained sound, and there is no hernia.

Very rarely insanity follows the operation of removing a fibroid by laparotomy, as it sometimes does other surgical operations. Attacks of insanity that I have seen after surgical operations, such as ovariotomy, for instance, come on with a normal temperature when recovery is taking place, and the insanity

becomes more fixed and established as convalescence merges into health. One of my patients was an elderly person, sixty-eight years old, who recovered rapidly from ovariotomy; another was much younger, being only twenty-five years old. I have never seen insanity after hysterectomy.

Tetanus I have seen twice in cases of other operators, but have never myself had an instance of it after hysterectomy. I have, however, had one case after an ovariotomy.

I invariably see that my patients who have recovered from abdominal hysterectomy are fitted with a firm abdominal supporter, and impress upon them the necessity of being careful about carrying heavy loads or straining themselves.

DISCUSSION.

Dr. Albert Vander Veer, of Albany, New York.

The conditions relating to fibroid tumors of the uterus, so ably presented in Dr. Homans's paper, are such as to command the attention of every abdominal surgeon at the present time. One's personal experience is but a small factor in the discussion of so important a subject, yet I trust as we drift together in a consensus of opinion it will result in placing the question on a more satisfactory basis. One has not to look back so many years in order to call to mind the somewhat chaotic condition that existed then in the minds of the profession, and the governing bodies of our public institutions, as to the treatment of ovarian tumors; and yet that question has been so satisfactorily settled that to-day there is but one opinion, and one that has won fully the confidence of the public and of the non-operating portion of our profession. As I look over the notes of cases that have come under my attention, and call to mind the various conditions which they presented, I find that the period of life from thirty to forty-eight years has been the most prolific in developing fibroid tumors. The relation between the size of the tumor and the amount of hemorrhage has attracted my attention in many cases, and I have long since learned to know that it is not the size of the tumor, but its location more especially, that has a bearing upon this symptom—hemorrhage, its discomforts and dangers; but when you make a careful analysis of the symptoms given you by your patient, you soon develop the fact that it is the hemorrhage that attracts their attention, and is the all-important symptom or factor that comes to the mind of the sufferer. In many respects the small, interstitial fibroid, or the submucous form that sooner or later takes on the condition of true polypus, or when, in Nature's attempts to form a polypus, the tumor presents a surface within the uterine canal, and in this way exposes the vessels to a condition of hemorrhage, not infrequently becomes the most dangerous. These tumors, although small, are frequently more serious than the large interstitial or subperitoneal, which often do not seem to produce that effect upon the functions of the tubes and ovaries, and the menstrual period, that is to produce a serious hemorrhage. These latter

cases will go on for some time and the tumors grow quite large without alarming the patient, except as they may produce pressure and a train of symptoms painful to endure. I have not found in my cases so natural a tendency for fibroids to subside promptly at the menopause—that is, I have found at this time that they not infrequently prolong the menstrual act; cases that would have ceased to menstruate at forty-five or forty-six go on to fifty-two, fifty-four, or fifty-five, in some instances the patient becoming so exhausted that an operation is out of the question, and that in some other cases the attempted menopause results in a starting-up, as it were, of an additional growth within the fibroid, and that we then have the change to a condition of sarcoma not infrequently present. The hope that has been extended to many patients, that if they could only pass their change of life at the proper time the fibroid would subside and disappear, cannot always strictly be given as true. I have seen not a few cases that seem to take on a more active condition at this time, and I have seen some few cases of fibroids that did not seem to give any indication of their presence until about the time of the menopause, or soon after; then would take on this activity of growth, becoming dangerous to the patient. I would say that the natural history in the direction of fibroids is for them to appear some time after the age of thirty, to continue more or less active in their growth, some subsiding at the time of the menopause—notably the interstitial and the subperitoneal varieties—while the intra uterine are the kinds that are likely to continue growing, thus prolonging the menopause indefinitely. There can be no question that the result of the fibroid, its development, duration, and termination, is very different in different individuals. I believe it is more pronounced in the tubercular and strumous subjects and in anæmic patients than in the more active sanguine temperament, the latter having a greater degree of resistance, the system better able to withstand the growth of the tumor.

As to treatment, there is no denying the fact that we are not by any means united as a profession in the care of these cases. The electricians have made many vigorous and spasmodic efforts, as it were, to treat them, but whenever the pendulum of professional opinion has swung in their direction, it has in like manner returned, and the feeling of the profession at this time, in this direction, I am sure, is away from the specialists who make use of electricity and electricity only. I must say that I have used and seen it used quite

thoroughly; that I have seen some successes, but that I have seen a greater number of disappointments I am willing to admit. I have learned to watch cases of uterine fibroids with perhaps more care than many of the surgical lesions that come under my observation, and which at the time seem to be more formidable, and perhaps give to the patient a greater degree of anxiety. The diagnosis as to the location of the fibroid is, to me, a matter of great importance when suggesting a line of treatment to the patient. I must say that at the present time my confidence in electricity is not great.

I believe the time is not far distant when operative procedures will be the line of treatment in cases of fibroids such as demand an active interference. When I have a patient presenting a moderately small fibroid, and the element of hemorrhage is such as to give alarm, I have two methods of procedure: One is to have the patient undergo a thorough curetting of the uterine cavity, under an anæsthetic; pack the cavity of the uterus well with iodoform gauze, leaving it in for two or three days, then repeating two or three times, if necessary, depending upon the firmness with which the uterus contracts, not washing out except at the time of the curetting. This I have seen arrest the hemorrhage in some cases in small as well as large fibroids, but in small ones I have seen good results follow from absorption, after curetting, the tumor quite entirely disappearing. When the curetting does no good, and the hemorrhage continues, I believe that the best line of treatment in small fibroids is an oöphorectomy, removing the uterine appendages, when cure invariably follows, except in soft myomas. The danger in treatment of fibroid tumors rests quite entirely with the size of the tumor. It is the large ones that give us our rate of mortality when coming to operation. Take a fibroid that weighs from twenty to thirty-five pounds, and it is a formidable surgical operation, even in the hands of the most skilful operator. If the case has been worked at by electricity the adhesions that have resulted make it still more embarrassing, but if no electricity has been used, the removal of the uterine appendages becomes very difficult: and these cases treated either by supra-vaginal hysterectomy, or, in addition, the removal of the stump that is left, present one of the most serious of operations, and one that taxes the strength of the patient to the utmost. It is astonishing to observe to what an extent cases of uterine fibroids are treated, by the average practitioner, by means of electricity, and to note how persons who suffer from this

form of tumor, their friends—the public, we may say—are willing to listen, almost at any time, to the suggestions of any line of treatment that may offer encouragement, short of the use of the knife.

We all know Mr. Keith's views as to the operation; we know how earnest Mr. Tait is in presenting his views on the question; Dr. Homans at different times has given us the result of his extensive experience in these cases; Dr. Joseph Price, of Philadelphia, has perhaps done as much as anyone to place the treatment of these cases upon a true surgical basis, and his views, as I have talked with him, I would like to take a few moments in presenting. He says that in small fibroids removal of the uterine appendages has been the most satisfactory. He states that in cases of large multilocular, nodular fibroids and in myomas, supra-vaginal, extra-peritoneal hysterectomies have given results about perfect; that he has had but one avoidable death in a series of eighty-two cases. The deaths among this number were as follows: In two the complication of malignancy, making the cases hopeless; in two pyæmia, antedating and being present at the time of the operation. In one of the latter two he found purulent peritonitis due to pus tubes and to ovarian abscess on the right side, symptoms of pyæmia being of five weeks' standing. The other case of pyæmia was due to the sloughing of a gangrenous fibroid, this condition of sloughing having existed for one month or more. The avoidable death was due to an accident, making a total of eighty-two operations, with five deaths, five Porro operations being included in this series, with no deaths. No evidence of peritonitis followed any of the operations in this series.

When we consider this splendid record, and look about and see the number of women whom we know to be dying of neglected fibroids, we cannot but emphasize the importance of bringing the attention of the profession in general more earnestly to the subject of operative interference in cases of this form of tumors.

Therefore, I must say frankly that when a patient consults me with uterine fibroid, when I have told her the necessity for operative interference, etc., and she is not willing to have it done, I say to her, "By all means, keep yourself under careful observation; let us watch the symptoms thoroughly well, and be prepared for any emergencies that may arrive."

Dr. Martin, in a recent number of the *Deutsche medicinische Wochenschrift*, contributed a paper entitled "What Promises the Electro-

therapy of Uterine Myoma?" in which he reports sixty-six cases treated by himself and his assistants in his private hospital in Berlin. These cases separate themselves very clearly into two groups, one of which where the tumors were mostly very small and the results have been correspondingly good, in the way that the pain and hemorrhage have been benefited for a time. Some of these cases have been symptomatically cured, but in no case has the tumor been known to entirely disappear. In no case has there been a notable decrease in the size of the tumor. In the second group of cases, *i. e.*, those of large tumors, no satisfactory results were observed. Out of the whole number of sixty-six cases, twenty cases were made symptomatically better (30 per cent.), forty-six showed no improvement, and three of the latter died under treatment.

Of the cases reported by Thomas Keith and Stewart Nairne, one hundred and six in all, twenty-eight were treated with good success; thirty-two, on account of the shortness of the time they took treatment, were not worthy of observation; seventeen were not made better; twenty-six remained worse, and five died under treatment.

Of the latest contributions by Schaffer, from the clinic of John Veit, there were forty cases, of which twenty were made symptomatically better, nine followed treatment but a short time on account of painfulness, five were not improved, four were made worse, and one died. Of all the cases of Keith's and Schaffer's, 19 per cent. of them discontinued treatment early, on account of pain and for other reasons best known to themselves; 32 per cent. remained symptomatically better; 44.4 were either not made better or made worse by the treatment; 4.75 died as the result of it. Martin regards the use of electricity in the treatment of uterine myoma as occupying the same position with other palliative means which have been previously employed for that purpose, and regards it from his own observation and that of Engelmann and others as being of no more value than many other palliative measures. Martin also speaks of the treatment of the complication of other tumors, degeneration, or myomas. Out of fifty-three cases, in twenty-three carcinoma, sarcoma, and cystic degeneration occurred; and in the same number of cases he saw pyosalpinx ten times, hydrosalpinx once, ovarian cyst once, double-sided ovarian tumor sixteen times, single one-sided tumor thirteen times, a few times dermoid cyst, and three times large hæmatomas. Of course, electricity could be of no benefit in the management of these complications.

Dr. Homans has given us some very striking points as regards the condition of the patients after operation, and has referred to some cases of the filling or blocking of the pelvis by the tumor thus causing obstruction. These latter cases should receive our prompt attention. I have seen cases of obstruction of the bowels due to these causes that were not thoroughly recognized at the time, and in one instance where the operation required came too late to be of any possible service, but had an operation been done a few days earlier it is very reasonable to believe that it would have been beneficial in saving the life of the patient. These cases where the Doctor speaks of the location of the tumor being connected with the cornu of the uterus and having quite a distinct pedicle, are the cases that will sometimes become twisted, the pedicle will take on the same condition that sometimes occurs in ovarian tumor, and strangulation will follow. These also will require prompt attention. I agree with Dr. Homans in his observations made upon the black race, and in a paper published in the *International Clinics* for 1892 I referred to the subject, giving some cases in illustration. I have had cases where the patient—one in particular, Mrs. N., of Greenville, N. Y.—was apparently in good health, but who was so troubled with the weight of the tumor, which was very large, that she insisted upon having an operation. This I did; the patient made a good recovery, and has been exceedingly comfortable since.

I cannot believe that removal of fibroid tumors during pregnancy is often required. We know that in many cases pregnancy will cause absorption of the tumor, even though it may be quite large, and unless the location of the tumor be such in the lower segment and outlet of the canal as to produce obstruction, I would certainly allow the patient to go on to full time, being prepared, if necessary, to do an abdominal section then—either a Cæsarean or Porro operation.

Hard fibroids are, in my experience, much more easily removed than the soft myomas. The adhesions are not apt to be so great in the former as in the latter. Dr. Homans has spoken very clearly and distinctly as regards the line of treatment. I think that we all indorse his views as regards the use of drugs: when possible to reach our cases in that way, to do so. And then as to curetting, I am thoroughly in harmony with him. As to removal of the tumor, with or without the uterus, my impression is that there are not many cases but that will require removal of the latter when the tumor is once attacked. Enu-

cleation by abdominal section is possible, and, as Dr. Homans has described, often successful. I have enucleated through the natural outlet, but it is a difficult and somewhat anxious operation, yet I am in favor of it in properly selected cases. I have succeeded in removing subperitoneal fibroids through Douglas's cul-de-sac with excellent results. I believe we must select our cases with care, as to the line of treatment required. I agree with Dr. Homans that fibro-cystic tumors are rare, more so than was believed at one time and as I was taught by the late Dr. Peaslee. I must say that I am thoroughly in accord with the treatment of large fibroids, which seem quite impossible to remove by operation, where hemorrhage continues, in using electricity, particularly in cases in which it is impossible to remove the ovaries.

As to the complication of ventral hernia, after supra-vaginal hysterectomy, I believe it is one of the conditions that will present in a small percentage of cases, notwithstanding all our efforts to the contrary, particularly after the use of the clamp; therefore, I am always desirous, if possible, of controlling the hemorrhage, using any variety of stitch that will bring together the peritoneal surfaces of the broad ligaments, dropping the pedicle back, and have been pleased with my results in that direction. That the bladder is sometimes implicated in the application of the clamp is but too well known, and yet it does not seem to increase the mortality of these cases.

Regarding the hot flashes to which Dr. Homans refers, after removal of the tumor or removal of the ovaries and tubes, I am certain that I have seen good effects from the administration of belladonna, with or without ergot. I have seen no cases of insanity or tetanus follow the operation upon uterine fibroids. I am firmly of the impression that all of these cases should wear an abdominal supporter for some time after the operation—for at least six months; not the supporter that is made like a truss with the heavy spring, but simply a gored bandage, something like that with a moderately thick Gamgee pad underneath.

Finally, the saddest of all cases of fibroids that we have to deal with are those where the hemorrhage continues, is not relieved, and the patients are brought to us for treatment when in such a condition of anæmia and thorough exhaustion that it is entirely out of the question for surgical interference to do any good. The risk is too great. The cases are really beyond our skill, but fortunately they are growing less and less.

Dr. J. Ewing Mears, of Philadelphia.

I regret that the title of Dr. Homans' paper did not permit him to discuss other of the interesting as well as important points connected with fibroid growths of the uterus, as to their histological and pathological characters—etiology—their relation to age, social condition, race, to the menstrual function and to the sterile and fertile condition of the female. These are all interesting points for study, and concern us more with regard to causative conditions and preventive measures The important question for the surgeon is with regard to the employment of operative procedures for the relief of these growths. Under what conditions is the surgeon justified in the use of operative measures? Dr. Homans has presented a classification of the conditions which I think may be simplified. I believe operative interference to be called for, first, in those cases in which hemorrhage occurs to such an extent as to endanger the life of the patient; and second, in those in which the pressure effects are such, either from the size of the growth or its peculiar conformation, as to render the life of the patient unbearable. I cannot agree with him that the question of operation rests solely with the patient in those cases occurring in unmarried females, who, suffering from chagrin, are willing to submit to the knife for relief. It is true, as he says, that "it is her tumor," but I do not think that she alone has the decision of the very important question to her as to the measures to be taken for her relief. She comes to the surgeon for counsel, and I believe it to be his duty to give her such advice as the condition which is present demands. A small, slow-growing pedunculated tumor, unless occupying such position as to produce distressing pressure effects on bladder or rectum, does not, in my opinion, demand surgical interference, which is, under the most favorable condition, of a grave character. Dr. Homans tells us that of a very large number of cases coming under his care and observation he has felt it justifiable to interfere by operation in but a very small proportion. My experience coincides with his in this respect. While I have removed by operation large subperitoneal growths, alone and with the uterus, and have operated on tumors of the submucous form by incision and enucleation, the greater number of cases I have treated and relieved by the use of medicinal remedies and electricity. I have at this time a number of patients who by this plan of treatment are able to enjoy life and perform the duties of their homes; in many of these cases I have felt

that resort to the knife was not demanded and would have resulted fatally. I believe there is to day much indiscriminate and unjustifiable surgical interference in cases of fibroid growths of the uterus with corresponding unreliable report; and I am glad to have placed on record the experience of Dr. Homans, whose opportunities for observation and study of these lesions have been so great.

Dr. George W. Gay, of Boston.

There is one point upon which I would like to say a word, and that is in regard to the treatment of fibro-cystic tumors of the uterus. I have never seen one operated on successfully, and was interested to hear Dr. Homans's experience. In one case I treated the growth by tapping. The tapping began in 1879, and during four years she was tapped about once every two or three weeks, the whole number of tappings being ninety, and the amount drawn at each operation being about five gallons. She has now not been tapped for several years, and is in a good state of health. The only medicine taken is a simple diuretic called "Princis Pine."

In another case there was a large tumor with a large cyst. I opened the abdomen and tapped the cyst, but I found that the attachments of the tumor were so extensive that I did not think she would recover if the tumor were removed. I, therefore, sewed up the cyst and returned it. She lived for three years and had about seventy tappings. During this period she was in a fair state of comfort. So far as my experience goes I should say that in these cases we had better temporize and get along with tapping.

Dr. Robert Abbe, of New York.

We are now more at liberty than ever before to attack large and serious tumors of the uterus and pelvis. In my limited experience of three cases in which I have removed the uterus with fibroid tumors varying in weight from two to five pounds, all of them successfully, I have been able to do the operation with a feeling of greater satisfaction each time. I feel that one who is familiar with this work can fearlessly remove these tumors with safety. The Trendelenburg position and the early securing of the arterial supply on either side of the uterus insures a comparatively bloodless operation, while the removal of the entire uterus, leaving a vaginal stump, gives a very clean and dry condition of the pelvis afterward.

The method of curetting the cavity in hemorrhage should be borne in mind and carried out largely. I was rather surprised at Dr. Homans's assurance that death from hemorrhage is rare. I have always feared it in these cases. It is one of the things that frightens the patient and alarms the surgeon.

With electrolysis I have had fair success, and would advise it in many cases. The tumor will often grow, but the hemorrhage will cease. In one case under treatment for two years the tumor has been reduced in size one-half, and the patient is in absolute health. The removal of the ovaries for the diminution of fibroids I have done twice, and in these cases there was rapid shrinkage of the tumor.

Dr. Vander Veer. I think that the discussion has been a very fortunate one and the ground well covered. I concur with the remarks of Dr. Mears, that palliative treatment should be carried out, but how far shall we go? It is the large tumors that give us the unfortunate mortality after the operation of supra-vaginal hysterectomy. These large tumors which are not controlled by any line of treatment are the dangerous tumors. If the patient is to have an operation it should be done pretty soon. Do not wait until she is thoroughly exhausted.

Dr. Homans. I had intended to speak in my paper in regard to the black race. I have had ovarian tumors in the black race four times out of about five hundred cases, but only one was a pure negro. I have seen, as Dr. Vander Veer has, a woman with a fibroid tumor producing so much hemorrhage as to make her blanched, and have seen her impregnated, delivered, and the fibroid tumor disappear. But we cannot prescribe this treatment.

In using the Apostoli treatment with high doses, such as from fifty to two hundred milliampères, you have to cover the abdomen with clay in order that the skin may not be burned. The vaginal electrode is covered with bubbles of froth and gas, and some kind of action on the lining membrane must take place. It stops the hemorrhage, but it does not prevent impregnation. Indeed, I know of women who attribute their pregnancy to the use of the Apostoli method; and it seems to me with some show of probability. It, therefore, does not "tan" the inside of the uterus and destroy its capacity as a mucous membrane to form a decidua. Electrolysis is not a routine treatment which I should adopt as Dr. Keith has done. He wrote to me some

five years ago that I must lay down my knife in the treatment of fibroids; but I should want to see more marked effects from Apostoli's treatment before I should abandon the practice of hysterectomy.

As a rule, fibroid tumors do not need to be removed unless they cause pressure symptoms or excessive hemorrhage or pain. But sometimes small fibroids are more intolerable than large, and if a small fibroid causes pressure it should be removed.

Again, some of these women in whom you have stopped the bleeding complain of distention and fulness. When the bleeding is stopped they are uncomfortable from plethora. You cannot be sure that you will always benefit them by entirely stopping the bleeding by electrical treatment.

Another interesting question is in regard to marriage in these cases. For instance, a mother will bring her daughter to me and ask what is the matter with her, and I find a fibroid. Then I am asked if I would advise her to marry, and I reply "No." If they do not take the advice they sometimes regret it. Some years ago a young lady came to me with her mother to consult me; she had quite a large fibroid, and I advised against marriage; four or five months afterward I was called upon by a medical man from a neighboring town—a neighbor of the young lady—in regard to this patient. He said she had increased rapidly in size, and that she had an ovarian tumor. I thought perhaps I might be mistaken in my diagnosis, and I went out to see her, and found she had been married for three months, and in order to settle the question I punctured the tumor with a little punch invented by Dr. Mixter and removed a core. On examination by the microscope this was found to be a portion of a fibroid. This puncture was followed by intense pain, and I had to inject a grain of morphine. This went on to insanity—exactly the condition you have in puerperal mania. I learned that she had not been unwell since her marriage, and I concluded that her alarming condition was due to my meddling with a fibroid uterus during pregnancy. On examination I found a tumor at the fundus of the uterus and below this the body of the uterus enlarged. I did not know exactly what to do, whether to procure an abortion if pregnancy was existing, but I decided to open the abdomen. I did so and placed the wire around the uterus. It settled into a groove, and a small pedicle about as thick as my thumb was left. Neither ovary nor tube was included in the stump. The insanity was not relieved at all by the removal of the tumor, and the

pain was as intense as before. In about ten days she had an abortion. The insanity lasted two weeks more and then cleared up, and she is now perfectly well. She menstruates more or less through the scar. I have advised her to have no children, but it would be interesting to see what would happen if she should be impregnated, whether the uterus would rise and carry the abdominal walls with it, or whether the stump would become separated, or whether delivery would take place through the scar or naturally.

I remember another curious case where I removed a fibroid by means of the wire, but did not remove all of the fibroid. The patient became convalescent and the fibroid began to grow from the scar, and began to be extruded, and at length I tied a rubber tube around the protruding tumor and removed a mass weighing three and a half pounds, and the woman recovered.

Whether enucleation from the interior of the uterus is dangerous or not, you have, at times, to practise it. A woman is bleeding, and you find a small sloughing piece of a fibroid sticking out into the cavity of the uterus. You have to leave her to die or you must remove it. If you start with an aseptic uterus and use the antiseptic douche you will probably come out all right, but it is different in a uterus just after delivery. I had a woman some years ago come to me, and I thought that she was pregnant. She had a very large fibroid besides. She was delivered at term, and the fibroid sloughed and protruded into the cavity of the uterus and vagina. I removed all I could of it a few days after delivery. The doctor who assisted me was laid up for several months with a sore thumb, and I had a bad hand which had to be lanced, and the woman died. She was septic when I saw her, and very putrid.

In regard to the patient deciding the question of operation: If a woman has a fibroid of good size with pain and bleeding, and it prevents her from working and she wants it out, I remove it. Where I think that there is no need for operation I refuse. I have seen cases such as Dr. Mears has spoken of. In such cases the best way is to separate the uterus and the tumor from the pedicle and leave the omentum and the large vessels until the last; then you have the omentum as a sort of a pedicle.

SURGERY OF THE TONGUE.

By N. P. DANDRIDGE, M.D.,
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In the following paper on the Surgery of the Tongue I shall confine myself to a discussion of operative procedures in malignant disease, and it may be well to first briefly review our knowledge of lingual cancer. This can be the more satisfactorily done, as there is agreement in the main by most authorities upon all the essential points. With scarcely an exception, cancer of the tongue appears in the form of an epithelioma. It affects males more frequently than females, it occurs most often between the ages of forty and sixty-five, and is more frequently situated upon the edge than the dorsum, and on the right than on the left side. It generally implicates the neighboring glands, but is seldom followed by metastatic deposits. It runs its course in an average of about a year and a half, and tends to a fatal termination by exhaustion from repeated hemorrhages, inability to take sufficient nourishment and from the swallowing of contaminated discharges, and from pneumonia or septicæmia. In a large proportion of cases it develops from an indifferent lesion which has been subjected to some form of continued irritation, and in only a limited number of cases can it be traced to any previous cancer in the family. The growth most frequently occupies the surface of the tongue, but may occur in the form of an interstitial growth; ulceration in both forms occurs early. In the *Middlesex Hospital Report* for 1888, all the cases of cancer which had been admitted for the previous seven years are carefully analyzed—744 in all. Of these, 135 affected the tongue or mouth; the uterus and breast being alone

attacked more frequently. 122 were males, and 13 females. The youngest case was twenty-five years old, and the oldest seventy-eight. Eighty-two per cent. of all the cases were found between forty and sixty-five years. The average duration of life in 29 cases which ran their course without operation was eighteen and four-tenths months from the time the disease was first noticed; the shortest time was five months, and the longest fifty-three months. In 33 cases in which the tongue was removed the average duration of life was nineteen and one-tenth months, the longest seventy-nine months. These figures coincide very nearly with those of Wölfler, who claims that statistics show a clear gain of six months of life in the cases operated on. In the 33 removals in which a fatal termination ensued the average duration of life after the operation was eight and nine-tenths months, the longest time was thirty-nine and three-tenths months. It is to be remembered that these results represent the work of a number of different operators and a variety of methods. In the table of treatment the operations tabulated are excision with knife, excision with scissors, removal with wire écraseur, and those destroyed by the actual cautery. A comparison with the work of recent individual operators will be made later. The situation in 100 male cases was noted as follows:

Right edge	25	(Middle, 12; base, 9;)
Left edge	18	(Middle, 9; base, 5;)
Cheek	10	
Floor near frænum	21	
Dorsum	4	

Here again we find an agreement with Wölfler. The mode of origin is given as follows:

Sore crack or ulcer	65
Hard lump or nodule	18
Pimple	5
Warty growth	3
White speck	3
Fungous outgrowth from socket	4
Boil and blister	2

In 52 per cent. of all the cases there was a history of some previous injury or disease. 28 cases were assigned to injury in

81—22 being due to irritation by bad teeth and 6 to other causes. 70 cases gave a history of disease of the tongue or mouth in 32—syphilitic lesions in 14; chronic superficial glossitis, 3; ichthyosis, 14, and a wart in one case. In 29 out of 80 cases there was distinct evidence of syphilis. Only 6 out of 80 cases had never smoked—41 had been great smokers, and 23 moderate smokers. The evidence here presented of a pre-cancerous stage in a large proportion of cases of carcinoma of the tongue is in entire accordance with the views of modern writers, who, apparently, without exception, enforce the frequency with which indifferent lesions may undergo cancerous degeneration. The frequency with which syphilitic lesions of the tongue undergo a transformation into cancer has been emphasized by Fournier, Hutchinson, Butlin, and others, and these lesions are now generally admitted to precede the cancerous growth in a large percentage of cases.

The conditions which are commonly described as chronic glossitis, chronic superficial glossitis, psoriasis, leucoma, and ichthysis are now considered, almost without exception, to have an important etiological effect in the production of lingual cancer, and the above figures given from the *Middlesex Report* are so fully borne out by general experience that the existence of a pre-cancerous stage in a large proportion of lingual cancers may be considered as definitely established, and to the above may be added the irritation of bad teeth, the continued cauterization of sores, "spirit drinking, smoking and rough eating," the latter of which probably go a long way in explaining the greater frequency with which the male sex is affected. The family history shows that in 64 cases where the facts were known, 59 of the fathers were dead. In 30 where the cause of death was known none were ascribed to any form of cancer, but 9 were due to consumption, or 30 per cent. Of the mothers there were 2 cases of cancer, uterus and breast one each, 2 due to consumption, out of 29. In 75 families phthisis was found among the brothers and sisters in 20. The frequency of phthisis and infrequency of cancer in the families of those affected with cancer of the tongue is a noteworthy fact, and sup-

ports very strongly the view that lingual carcinoma is at first a local affection. In 34 cases of recurrence the average time after operation was five months—the shortest two weeks, and the longest fifty-two months. 22 of the cases recurred in the cicatrix at the primary seat, and 10 in the adjacent glands alone. 30 of the 32 cases recurred within a year. The figures above given are in marked contrast with the experience of Hutchinson given in a recent lecture, in which he states in justification of partial excision that in only four cases did recurrence take place within the mouth. The figures given in the *Middlesex Report* as to the condition of the lymphatic glands are of especial importance. In 94 primary cases there was an obvious enlargement in 78, or 83 per cent. In the remaining 16 there was no enlargement discovered. The following glands were affected :

Right side of neck (chiefly sub-maxillary)	28
Both sides	17
Left side (chiefly sub-maxillary)	16
Sub-mental	5
Left and sub-mental	3

Verneuil has pointed out that the lymphatics in three different localities may be affected, and that these regions should always be examined in cancer of the tongue, the sub-maxillary, suprahyoid, and the glands over the parotid sheath. Hutchinson says the gland affections may occur in any one of several regions. "The commonest part is in the floor of the mouth. A second is under the anterior edge of the sterno-mastoid, where, if it is single, it is easily accessible, but not infrequently several glands surround and are adherent to the sheaths of the vessels. The worst position of all, and not very infrequent, is behind the mastoid process and the upper part of the sterno-mastoid. In 52 autopsies on cases of cancer of the tongue the adjacent glands were involved in every cases except one, and in 30 cases both sides were affected. (It is generally admitted that metastatic deposits do not often occur). Wölfler asserts that where the growth is confined to the tongue itself the glands behind the angle of the jaw are most likely to become

infected; while if the floor of the mouth or sides of the cheek, the sub-maxillary glands. In these cases metastatic deposits were found 7 times—both lungs and liver twice; both lungs twice; liver, mesentery glands, and left kidney each one. The causes of death in 51 cases not operated on are given as follows:

Asthenia	31
Catarrhal pneumonia	6
Phthisis	4
Gangrene of lungs	3
Oedema glottitis	3
Secondary disease in thorax and pulmonary congestion each	1
Syncope	2

The time and circumstance of the involvement of the adjacent gland demands more study. They may become infected in two or three months, or may remain apparently free for eight or nine months. The tendency to more radical operations is certainly more and more evident, and it may be that future progress is to be made in the line of treating the sub-maxillary space in cancer of the tongue in the same thorough manner as is now generally done with the axilla in carcinoma of the breast. Satisfactory exploration for minute glands is as difficult in one region as in the other. Death sometimes occurs from hemorrhage, but is much more frequently due to exhaustion brought on by repeated small losses of blood, by the inability to swallow a sufficient amount of nourishment, and by the deleterious effect of foul discharges which constantly find their way into the stomach or lungs. A condition of septicæmia hastens, if it does not directly determine, death in a number of cases. It is not my purpose to discuss the diagnosis of cancer. Other forms of tumor occasionally occur, but so seldom that they may be left out of account, especially as removal by the knife is the only efficient treatment. Mistakes of this kind are only likely to occur when the growth is within the substance of the tongue. In ulcerated epithelioma the diagnosis will most often hesitate between tubercular and syphilitic ulcer. The latter we have seen is often transformed into true carcinoma. Mistakes are undoubtedly often made, and Butlin quotes

Nedopil as saying that the four tuberculous ulcers he had met with had all been cut out under the mistaken idea that they were cancer, and the diagnosis only made after operation. Bull has recently reported a similar instructive case. Frequent accounts of tubercular ulcer of the tongue are now met with in current literature—the diagnosis being verified and based upon the demonstration of the bacillus tuberculosis, and it is not impossible that mistaken removals have taken place much more frequently than is supposed. It is not impossible that some of the more brilliant cases where life has been prolonged for many years may have been tubercular and not cancerous. A diagnosis of a tubercular ulcer of the tongue ought to be made by the discovery of the bacillus. I have recently had the diagnosis of a doubtful case thus verified, the bacilli being found in large numbers in the scrapings. It is said, however, that this search is not always successful, even where the tubercular character of the lesion is undoubted. The mistake of a tubercular for a cancerous ulcer cannot, however, be considered a very serious one, for the complete removal of the former would here, as elsewhere, be the surest means of cure and the greater security against further infection. A less extensive operation, however, would probably be indicated in most tubercular cases. Syphilitic ulcers may occur as secondary or tertiary lesions—rarely a primary lesion. Difficulties of diagnosis are most likely to occur in cases of tertiary lesions. The presence of enlargement of the cervical glands is presumptive, though, not positive, evidence against the case being syphilitic. Iodide of potash in sufficient doses will soon render the diagnosis clear, and should be energetically tried, but there is great uniformity in the advice given by most recent writers not to prolong the course if evident improvement does not occur in ten days or two weeks. Careful search for the bacillus and careful microscopic examination of a scraping of a sore for the characteristic cells of epithelioma should always be made, and if the examination is negative an anti-syphilitic course should be given. If this last is without effect after a reasonable time a free removal of the sore ought to be practised, even in the absence of definite

signs of cancer. Hutchinson recommends that the microscopic examination should be made after and not before removal of the growth. Turning now to the treatment of cancer of the tongue, the subject naturally divides itself into the operative or radical, and the pallative, indicated where the disease has passed beyond the range of surgical interference. Nothing short of complete removal can be considered as at all curative. Where the sore to be removed is limited in extent, whether distinctly cancerous or not, a large area of healthy tissue should always be taken away by a clean incision with scissors or knife, the removal of the entire tongue not being necessary in such cases. The advisability of bringing the edges of the wound in these operations together by suture is answered differently by different operators. Where the tip or edge in its vicinity is the seat of disease, a wedge-shape section reaching well behind the sore ought to be removed. These partial excisions seem to give as great immunity from return as the removal of the whole or half of the organ. The operations are much less severe, and the function of the tongue in swallowing and speaking is better preserved.

Before entering upon a discussion of the operative procedures for the removal of the half or whole of the tongue, which have received the sanction of experience and are now most in vogue, it will be of interest to briefly outline a history of the operation through its various phases of development up to the present time. The progress of development has been marked by a tendency to more and more thorough removal of all disease, but at the same time to a restriction of complicated methods and to the adoption of simple procedures. Throughout this development the fear of hemorrhage and the apprehension of blood gaining access to the lungs at the time, or subsequent, to the operation have been conspicuous and controlling features. The elaborate tables of Wölfler (*Archiv f. Klin. Chir.* 81, 82) have been the source from which subsequent writers have drawn their data for historical views of the subject and from the basis of both Barker's and Butlin's account. We may properly ignore the earlier operations dating back to Pimpernelle, in 1658,

and the early attempts to destroy the disease by strangulation and consequent sloughing of the tongue by means of ligatures, and the barbarous procedure of circumpuncture with rods of caustic introduced by Girouard, and may omit the futile attempts to control the growth by ligature of the linguals, and commence our sketch with the operations which form the basis of modern methods, and are still more or less employed.

Regnoli, in 1838, removed the tongue by an incision reaching from the chin to the hyoid bone. This incision was enlarged by lateral incisions next to the chin, and the floor of the mouth opened, and the tongue removed by scissors after being drawn through the opening in the neck, and after hemorrhage had been provided against by a number of ligatures. It is worthy of note that Regnoli's patient was seated in a chair with her head resting against the breast of an assistant—a position which closely resembles the one now recommended by some of the most recent operators. The sub-mental or supra-hyoid operation was modified by Billroth by omitting the longitudinal incision and extending the cut below the chin further back on either side, so as to make it available for the removal of the glands and the ligation of the sub-lingual artery. It was practised by this surgeon from 1871 to 1876, but given up on account of the great mortality, 8 out of 13 cases, or 61 3-10 per cent. dying. During the same period his removals by the mouth showed a loss of 18 7-10 per cent. in 32 cases. A sub-mental opening into the floor of the mouth was utilized by Chassaignac, and has recently been strongly advocated by Barwell for the passage of the wire of the écraseur. These methods are properly écraseur operations, and will be alluded to later. Kocher, in 1880 (*Deut. Zeitschrift. f. Chir.*, 1880) published the account of his operation by a sub-maxillary incision after a preliminary tracheotomy and with a complete clearing out of the sub-maxillary space with ligation of the facial artery on the side affected and both linguals if necessary. The tongue was removed through the opening in the neck by scissors or galvano-cautery. This method in his hands was followed by a single death in 14 cases. Numerous operators have used and modified the opening from

the neck for the removal of the tongue, and it has many strong adherents as being the only means of affecting a thorough radical operation when the glands are involved, for as Verneuil has pointed out, even if the implicated glands are removed by an incision over them after the excision of the tongue, the intervening tissue containing the lymphatic channels through which the disease has spread is left behind and must endanger a further infection. Kocher's method has received approval, though considered too serious an operation for general use, and does not seem to have been largely used by any operator except its originator. The removal of the tongue by écraseur was first performed by Chassaignac in 1854, the wire being carried into the mouth by a puncture from the neck so as to embrace the better the base of the tongue. Its use has been strongly commended by a large number of eminent operators, used either through an incision in the neck or introduced by the mouth. Among those who have advocated its use and proclaimed its advantages may be mentioned Nunnely, ten cases and ten cures; Reid, four cases and four cures; Nottingham, Annandale, Kuester, Rose, Busch. Recently Barwell has described a modified method of cutting through the base of the tongue by the wire introduced through an incision in the neck and completing the removal by a second écraseur introduced through the mouth. The great advantage claimed for the removal by the écraseur is that the removal is secure against primary hemorrhage. The écraseur has played an important rôle in the removal of the tongue, and is still employed and strongly advocated by not a few of the more prominent surgeons. Among these may be mentioned Bryant and Hutchinson, the latter of whom has recorded his views in its favor in a recent lecture (*Brit. Med. Journ.*, Dec. 1891). It has, however, decidedly lost ground in recent times, and some of the later writers condemn it in unmeasured terms. Treves says: "The instrument is barbarous and obsolete and not in conformity with the principles of surgery. It represents the most slovenly and least efficient method of removing a part," while Whitehead asserts "that the wound left after the use of the écraseur embodies every condition calculated to engender

those putrefactive changes which it should be our primary aim to avoid; the erratic course of the écraseur wire is absolutely beyond our control." The galvano-caustic loop introduced by Middledorf in 1854, and at one time largely employed by Bryant, seems to have been practically abandoned, and is condemned by Wölfler as "most often followed by hemorrhage, and no protection against wound infection and recurrence." According to this author, Just in 19 cases had hemorrhage in 10. Angier in 45 cases found primary hemorrhage in 5, and secondary in 8, and Schlaepfer met with hemorrhage 9 times in 30. In this, now very general disapproval of the use of the écraseur wire, an exception may possibly be made in favor of the method introduced by Morant Baker (*Brit. Med. Journ.* 1883, ii. 765) in which the tongue is split along the median line after being fully freed by scissors from the floor of the mouth, and then removed in halves.

Division of the lower jaw was first practised by Roux, 1836 (Butlin), subsequently by Sédillot and Syme. The operations of this latter surgeon have had a marked effect upon the surgery of the tongue among English-speaking surgeons. Billroth modified the division of the jaw by practising a temporary resection of the body of the bone, which was subsequently replaced and wired, but later this surgeon admitted the superiority of Langenbeck's method of division of the bone and soft parts opposite the first molar. The experience of Billroth, however, is not favorable to the division of the jaw in removal of the tongue. In 12 cases he had 3 deaths, 3 recurrences, and 1 case free two years after operation. The remaining 5 could not be traced. In the list of cases of excision and resection collected by Wölfler from various operators the same unfortunate result is to be seen. In 49 cases there were 17 deaths or 34 per cent., and 14 recurrences of the disease. Anger has collected 20 cases of section of the jaw, with 10 deaths. The conclusion which Wölfler reached was that section of the jaw in the removal of the tongue involves "great danger, much discomfort, and no better results" as far as a radical operation is concerned. The advantages of section of the jaw have been

recently again strongly advocated by F. Krause (*Deut. med. Woch.*, May 30, 1890), where there is extensive disease of the tongue and mouth, based upon the statistics of Volkmann's clinic, and it must be confessed his figures are most striking and fully justify his conclusions. In 35 operations there was 1 death from lobular pneumonia and 1 from causes not connected with the operation.

Division of the cheek in order to obtain freer access to the organ was introduced to the English-speaking surgeons by Collins, in 1867, after first being practised by Jaeger in 1831. It has received the approval of Butlin, on *Diseases of the Tongue*, and has been commended by Fourneaux, Gant, Wagstaffe, and Rose. Jacobson considers "this step an excellent one," and Treves also seems to approve of it. Wölfler, however, says that it is unnecessary and far inferior to Kocher's method. Volkmann also condemns it. It must add to the discomfort, it certainly is permanently disfiguring, in no way facilitates the removal of glands, and, it would seem, can be of advantage only in the limited number of cases where the disease is confined to the tongue situated far back, or where the jaws cannot be sufficiently widely opened.

The advisability of the preliminary ligature of the lingual artery is still under discussion. Introduced by Mirault in 1833, it has been extensively practised and strongly advocated by Billroth, and recently by Treves in his work on *Operative Surgery*. The former surgeon considers that it is to be commended as a rule. In 63 cases, in only 1 was there hemorrhage, and "as a rule when both arteries are ligated the muscles appear as bloodless as when an Esmarch bandage is applied to a limb." In Treves' experience of 34 ligations of both linguals there was no hemorrhage. Jacobson and Whitehead both deny that it is reliable as a safeguard against hemorrhage, and to this Krause also agrees. In a personal case, where the sub-lingual artery was ligated on account of hemorrhage from a wound in the tongue by a knife, which had pierced the cheek, the hemorrhage recurred in forty-eight hours, and required a ligature of the external carotid. Hutchinson condemns it as unnecessary

and as adding a complicated and difficult step to the operation. In this latter view I am inclined to think the majority of surgeons will agree.

Preliminary laryngotomy was advocated by Kocher, in connection with his operation, on the ground that it allowed of complete plugging of the pharynx during the operation, and so avoided the escape of blood into the trachea, and by breathing through the tube during the first few days the great danger of septic pneumonia was avoided. This step has been highly commended by Jacobson, but is generally condemned as adding an additional element of danger. It is wise, however, always to be prepared for tracheotomy in case it should become suddenly necessary. In removal of the tongue for limited disease Péan uses hemostatic forceps. One pair grasps the tongue transversely behind the growth. A second is applied in the median line, and a third grasps the tissues in the floor of the mouth. Spurting arteries are grasped by forceps and a ligature applied, or the forceps left in place for twenty-four hours. This method meets the approval of Duplay in his recent Surgery, but has not apparently been further adopted. Finally the simplest of all procedures, the removal of the tongue through the mouth by means of scissors was introduced by Whitehead, and has been steadily gaining in favor ever since, until it seems likely to supplant all other operations, either in the form suggested by the author, or with some of the slight modifications advocated by other operators. Removal of the tongue by scissors after ligature of the linguals was adopted independently by Billroth at about the same time, after this surgeon had tried the sub-mental incision, division and resection of the lower jaw, and splitting of the cheek, and his later operations have apparently all been made in this manner.

In this sketch of the operative methods for the removal of the tongue we may mention the suggestion of Heath to control hemorrhage by hooking the finger behind the base of the tongue or stump, and drawing it forcibly forward, and the further suggestion of Treves for the same purpose of pressing forcibly with the fingers in the neck, so as to make the floor of the mouth

more prominent, and bring the spurting arteries more readily within reach. Jacobson has shown that the extraction of the incisors of the lower jaw facilitates all forms of operation through the mouth by enabling the operator to reach more easily the frænum and floor of the mouth. The attempt to cover the surface of the wound in the mouth by bringing together the mucous membrane over it was at one time practised by Billroth, but given up as causing great pain and swelling and increasing the distressing flow of saliva. It is now strongly advised by Péan, Duplay, and Volkmann, but does not seem to be generally adopted.

It remains now to describe more minutely the steps of the various procedures, which at the present time are prominent candidates for professional favor, and to describe the results which have been obtained. Before, however, giving the details of the different methods we may adopt the propositions laid down by Treves as fully justified by the preceding discussion.

First. The organ should be removed by cutting either with scissors or knife.

Second. The removal should as a general rule be effected through the mouth.

Third. Every means should be taken to reduce the hemorrhage to a minimum.

Fourth. When the floor of the mouth is involved, or the glands extensively involved, the excision should be carried out through the neck.

The methods we shall describe are Whitehead's, Morant Baker's, Kocher's, and Volkmann's.

The following account of Whitehead's operations is obtained from the *British Medical Journal*, May 2, 1892, in which his entire experience is embodied up to that day. A few days of preparatory treatment is urged as judicious for "the purpose of generous feeding and more especially to obtain a cleanly condition of the mouth." Chloroform is used, though no objection to ether is known. "The gag which secures the wide opening of the mouth must avoid pressing back the jaw, so as not to impede respiration. The patient is in a sitting posture, with

the head firmly erect, with a slight inclination forward, in such a position that the light will fall well into the mouth."

To prevent the tendency of the patient to slip down, "he should recline against an almost perpendicular back-rest, with the thighs bent at almost a right angle over the elevated portion of the operating-table." A ligature is passed through the anterior part of the tongue, and straight, blunt-pointed scissors are used for the section. "The two structures which are principally responsible for the retention of the tongue within the mouth are the frænum and the anterior pillars of the fauces, and if these structures are completely divided the tongue can be so freely drawn from the mouth that the operation is converted into an extra-oral incision." The tongue is rapidly separated by cutting through these structures and the floor of the mouth, and instead of the cautious snipping originally advocated the author "now cuts boldly until within the immediate vicinity of the main artery, disregarding all bleeding unless an artery distinctly spurts when it is twisted." "The more profuse the general bleeding," he says, "the more rapidly do I proceed, my object being to get as quickly as possible at the main artery, as I have confidence that all subsidiary bleeding will cease immediately after their division. There is in reality no difficulty in determining the position of the lingual arteries, as they are invariably found in the same situation, and it requires very little experience to seize them with a pair of forceps before dividing them. If this is done there need not be the slightest hemorrhage from this source. When once the vessels are twisted the rest of the tongue may be removed without any further anxiety about hemorrhage; but it is desirable before severing the last attachment to pass a loop of silk through the glosso-epiglottidian fold as a provisional measure of security in case it may become necessary to make traction on the posterior floor of the mouth, either to assist respiration or to arrest any possible consecutive hemorrhage." This thread is a source of annoyance, and is withdrawn within twenty-four hours, and has really only been of practical use in two cases. The cut surface is then rendered as aseptic as possible by swabbing the parts

with a biniodide of mercury solution, 1 to 1000, and painted over with an iodoform stiptic solution. Friar's balsam, in which the spirits are substituted by a concentrated solution of iodoform in ether, one part to ten of turpentine having been added to the ether. This varnish is repeated daily. The patients are not confined to the bed, but encouraged to walk out the day after the operation if there is sunshine, and there is no "worse practice than keeping patients lying flat on their backs in bed." The average time of convalescence is seven days.

The scissors are preferred to the écraseur because they leave a clean cut surface instead of a bruised one; and, further, because with much greater certainty all diseased tissue may be removed. Whitehead has recently published the result of his entire experience in the removal of the tongue in part or in whole, 139 times. In the table given below 10 successful cases of removal by the galvano-cautery, and 25 partial removals by scissors are excluded, and there remain 104 cases of total removals by the method above described, with 20 deaths, or $19\frac{21}{100}$ per cent., or calculated upon the whole number, $14\frac{3}{10}$ per cent. When glands and jaw were involved, 77 per cent. and 57 per cent. respectively.

104 cases of excision of entire tongue with scissors gave 84 recoveries and 20 deaths.

Excision through the mouth, 79 cases.

Simple and uncomplicated, 66 cases, 63 recoveries, and 3 deaths.

With removal of floor of mouth, tonsils, and glands, 13 cases, 9 recoveries, and 4 deaths.

Preceded by laryngotomy and tracheotomy, 9 cases, 7 recoveries, and 2 deaths.

Excision below the jaw, 9 cases, 2 recoveries, and 7 deaths.

Division of jaw or removal of portion of jaw, 7 cases, 3 recoveries, and 4 deaths.

These figures at once strike us as presenting most favorable results in the simple removal of the tongue and an unusual mortality in the limited number in which removal was effected

from the neck or by division of the jaw. These latter cases probably belong to the more desperate ones.

The results are stated to be that in 61 cases where positive evidence was obtained, 15 patients survived the operation one year; 4, two years; 2, three years; 4, five years; and one, six years. Twenty-six cases, therefore, were living more than a year after the operation. This is the best result yet published by any authority.

Of the value of Whitehead's operation, Treves says "there can be no question," but advises the preliminary ligature of the linguals as facilitating the removal by preventing all hemorrhage, and recommends either Coleman or Mason's gag.

Jacobson, who believes that it is of great advantage to leave half of the tongue where possible, commences the Whitehead operation by splitting the organ down the raphe with a sharp pointed bistoury, and further urges the advantages of preliminary tracheotomy, but condems the ligature of the sublingual arteries. Mr. Treves reports in 34 cases of entire removal of the tongue with scissors, and preliminary ligature of both lingual arteries, that he has had one death from pneumonia, one from pyemia, and a third patient with aortic and mitral disease died shortly after the operation.

The only écraseur operation which I shall describe is the one suggested by Morant Baker, and the account is taken from Heath's Dictionary. "After the introduction of a suitable gag and the removal of any sharp or jagged teeth which might be in the way of the operator, two threads are passed through the tongue about an inch behind the tip and half an inch from the median line. The tongue now being drawn upward and forward, the frænum, and as far as may seem necessary, some of the muscular attachments of the tongue to the lower jaw in front are now slipped through, as advised by Sir James Paget, with strong, blunt pointed scissors, and then the scissors are run along the floor of the mouth at the side beneath the mucous membrane as far back as may seem requisite, keeping close to the lower jaw, both for the avoidance of hemorrhage and for the sake of keeping clear of the disease. The operator now with his fore-

finger clears the tongue in front and at the side, and drawing it well forward again and giving one thread to his assistant, while he holds the other himself, he cuts along the middle line of the tongue from the tip backwards, and further along the mucous membrane. On withdrawing the knife the finger is again introduced, and it will be found quite easy to complete with it the median division of the tongue by a little tearing or splitting into two halves.

The only part which cannot be thus torn is the mucous membrane of the dorsum. Hence the advice to divide this with the knife as far as may seem necessary for getting beyond the level of the disease. The écraseur is now slipped over the diseased half of the tongue. This, of course, is the most important part of the operation, any want of care in this stage being shown by the narrow margin of healthy tissue, or by none at all, left attached to the diseased mass. The insertion of one or two curved needles well behind the disease before the application of the écraseur, in order to insure the division in healthy tissue, is advisable, but for the reasons previously given must not be considered a sufficient safeguard in the absence of free separation of the tongue's attachments in front and at the sides. When one-half of the tongue is removed the process is repeated on the other. "An écraseur curved on the flat armed, with strong whipcord is used. Where there is difficulty in placing the cord behind the disease the cheek may be split with advantage. Commonly the main vessels and some other tissue, perhaps nerve-fibers, are pulled through the end of the écraseur after the softer tissues of the tongue have been cut." And may be secured by double ligature and then cut. After this glands should be searched for and removed either from the floor of the mouth or by an external incision. If hemorrhage should occur Heath's method of controlling it has been found serviceable.

In the after-treatment iodoform in powder is applied to the cut surface and renewed when the wound becomes foul, small pieces of ice are kept in the mouth, and mouth-washes constantly used, and in almost all cases the patient is fed with a tube

and funnel. When necessary nutritive enemata are resorted to. Baker reports 40 cases, with 5 deaths.

In the above operation the écraseur is only used to cut through the tissues of the tongue after the organ has been fully freed by the scissors.

There are several steps in the method advocated by Baker which have proved important additions to the operative technique in the removal of the tongue. When the tongue is to be split into lateral halves he has shown the advantage of two threads passed through the organ behind the tip one on either side of the median line over the single thread generally used.

His method of splitting the tongue by first cutting through the mucous membrane on the dorsum sufficiently far back, and then tearing through the raphe avoids all hemorrhage, and is a great improvement over division by scissors or knife.

No statistics based on a large number of cases operated on by Baker's method have been published, but it seems to have been largely practised and to have met with general favor.

Kocher's operation has received the commendation of most of the later writers for cases in which the floor of the mouth and sub-maxillary and cervical glands are involved, though it apparently has not been largely practised, as being too serious an operation in cases in which the growth is confined to the tongue. Kocher commences his operation by a tracheotomy and fills the fauces with a sponge wrung out of carbolic acid and secured by a string. The description of the operation is taken from Butlin. The first incision is made along the anterior border of the sterno-cleido-mastoid muscle, commencing a little below the tip of the ear. From the first a second incision is made from the middle of the sterno-mastoid muscle to the hyoid bone, and along the anterior border of the digastric to the jaw. The flap is turned upon the cheek, and the facial artery and vein and the lingual artery are tied. The sub-maxillary fossa is then completely cleared out, commencing from behind; the lymphatic glands are all removed, and even the sub-maxillary and sub-lingual glands if the disease lies so near as to affect them. The mucous membrane is now divided along the lower jaw, and as

much as is necesssary of the mylo-hyoid muscle is separated from the bone, the tongue is drawn down through the opening, is exposed with great ease and is removed either in part or in whole with scissors or the galvano cautery. The galvano cautery is preferred by Kocher on account of the less liability of oozing after it has been employed. If the whole tongue is removed the lingual artery of the opposite side must be ligatured through a separate incision. "If the operation is great the external wound is not to be closed with suture." The tracheotomy canula is left in and allowed to lie loose in the trachea, as usually after tracheotomy. In order that the wound shall not in the slightest measure be infiltrated by the discharges the skin flaps are fixed back with sutures, and the entire cavity from the entrance of the wound right back into the mouth and pharynx is plugged with a tampon of gauze soaked in a solution of carbolic acid of 5 per cent.; but before so strong a solution of carbolic acid is applied directly to the mucous membrane of the mouth the tampon is just washed over with water, the sponge or gauze lies immediately on the epiglottis or root of the tongue, and fills the bottom of the wound as far as it is covered with mucous membrane. The whole operation is done under the carbolic spray, the patient may be fed partly by the rectum, but feeding is accomplished chiefly when the dressings are changed. This is done twice a day under the spray and before fresh dressing is applied. Nourishment is given through a tube introduced into the stomach. In 14 cases thus operated on there was only one death. Kocher's operation is indicated when the floor of the mouth is extensively involved or where the glands beneath the jaw are enlarged. It not only enables the surgeon to fully clear out the sub-maxillary space, but secures the removal of all the tissues which lie between the primary seat of disease and the infected gland, the importance of which as a source of future danger has been pointed out by Verneuil. At the present day the spray must be regarded as superfluous, and the preliminary tracheotomy is probably unnecessary.

The extraordinary success which has followed Volkmann's method of operation, as recently reported by Krause, renders it

desirable to describe the special procedure which has been adopted by this surgeon. In 91 cases of tongue cancer which were operated on there were only 2 deaths directly attributable to the operation. Tracheotomy and tamponade are discarded and splitting of the cheek considered useless. The following account of the two methods adopted is taken from the *Annual* of 1890: "If the tongue can be drawn beyond the dental arch a resection is made by means of a knife or scissors, while the patient is seated upright in a chair, so that the bood flows away from the pharynx and there is no danger of it being drawn into the lungs. After bleeding is checked the mucous membrane can at once be brought together, or if there is a long strip of healthy tongue left this can be brought around so that a short but broad organ is left. If, however, the carcinoma extends so far posteriorly that strong traction is not sufficient to bring it near the dental arch, or if it has involved the floor of the mouth or tonsils, then the parts can be best exposed by dividing laterally the sub-maxillary bone; the patient is upon a table in an almost sitting posture, a traction thread is passed through the tongue and the latter is drawn forcibly forward. The lower canine or first molar tooth is then drawn, after which an incision is carried directly downward from the corner of the mouth to the larynx, dividing the periosteum of the lower jaw, but made more superficial in the neck. The periosteum on the lower surface of the lower jaw is now pushed aside sufficiently to allow a broad iron lever to be passed upward until it rests upon and protects the upper lip. The jaw is divided upon this lever by a thin broad-bladed amputation saw; cutting obliquely backward, a strong resection hook is placed in each opening of the exposed intra-maxillary canal, the two portions of bone are drawn forcibly apart and the soft parts of the mouth are divided on a line of the first incision. Sufficient room is given for readily securing all bleeding vessels. The palato-glosso fold is divided and a drainage tube, the size of the little finger, placed in the tonsillar fossa and curved to the lower portion of the neck incision; 35 cases gave 1 death, due to pneumonia." The cut surfaces are covered by mucous membrane and the bone wired, the patient

retains a half-inclining posture, and is fed on liquid diet by means of a long glass tube extending far back into the mouth, which is irrigated after each meal with a 3 per cent. boric acid solution. One case was living after six years, the average of life was about one year. Of 37 partial excisions 3 have survived without relapse for over three years. Any attempt at tabulating and comparing the results obtained by different operators must be evidently unsatisfactory and unreliable. The cases differ so much in severity and in the immediate danger, and operators still differ so much in their views of the necessary extent of the operation indicated, that a standard of comparison is impossible. Between the partial excisions of Hutchinson and the case reported by Whitehead, in which the entire sterno-mastoid muscle and jugular vein were removed and the whole extent of the parotid laid bare in order to fully remove all the glands involved, there is so much dissimilarity that the results cannot be judged together. Mr. Treves' estimate that the immediate mortality is now about ten per cent. may be considered as nearly correct, and shows a marked improvement in the recent operations over earlier experience. There is evidence to show that the operation of removal by scissors is growing more and more popular, while the écraseur is certainly losing ground. Mr. Butlin, writing in 1885, gives his preference for Baker's method because he "had not seen Whitehead's operation often performed." During the last five years *St. Bartholomew's Hospital Reports* (Mr. Butlin's Hospital) show that the whole tongue was removed by scissors six times, and the lateral half by the same method twenty-one times during the last five years. During the same time the écraseur was used in seven cases for removal of half of the tongue, and seven times for removal of the whole. In 1891 the écraseur is reported as being used only once in ten cases. In a table of fatal cases of removal of the tongue a very large proportion will be found due to septic pneumonia, induced undoubtedly by the escape of blood into the trachea at the time of operation, or from some of the subsequent discharges from the wound in the mouth reaching the lungs. Cellulitis of the neck, collapse, hemorrhage, pyemia, and septicæmia are all causes of

death. The great frequency with which the lungs become involved has induced different operators to avoid all possible loss of blood at the time of operation; indeed, hemorrhage in these cases is serious not from its amount, but because it obscures the field of work and from the danger of blood reaching the trachea. The history of the operation is a history of efforts to avoid these dangers, and in the after-treatment to avoid the danger of foul and decomposed discharges developing in the mouth. The three great factors in the after-treatment are summed up by Treves as follows:

1st. Let the patient be well fed.

2d. Let all the discharges escape from the mouth.

3d. Keep the cavity of the mouth clean and sweet.

The first of these is now generally admitted, and if the patient can swallow sufficient food the mouth is the best channel, a tube being only exceptionally needed for the first few days; if necessary nutrient enema may be employed. The second of these conditions is met differently by different operators. The great advantage of the sitting or half-raised posture is now largely recognized, and the very great disadvantage of continued recumbency after the operation enforced. Whitehead encourages the patient to get up on the second day, and Treves approves of the same plan. Some operators depend largely upon a drainage-tube, whether the mouth has been opened from the neck or not. In order to keep the mouth clean and sweet the most various plans and greatest variety of washes have been adopted. Some depend upon frequent syringing, while others prefer constant gargling. Permanganate of potash, carbolic acid, sublimate solution, boric acid, and spirits and water have all been used and strongly commended. Billroth attempts to prevent contamination by the careful packing with iodoform gauze. This method does not seem to have found favor with English surgeons. Butlin lost a patient with a septic pneumonia, and Whitehead is reported by Treves to have had the dressing swallowed in one case. A very large proportion of operators, however, rely largely upon iodoform frequently dusted upon the wound. In this connection the styptic iodoform solution of

Whitehead should be mentioned. The important thing seems to be the frequent removal of the discharges from the mouth, and for this purpose there is great advantage in having the patient up and out of bed. There remains to be considered the best palliative treatment where operation is not indicated or where the patient refuses surgical interference. Pain is the first symptom to be considered. It is generally present in a marked degree. Butlin approves of the application of a powder of iodoform, one grain; morphine, one-sixth to one-half grain; and borax, three grains, applied directly to the painful spot. A number of authors mention the same application, but apparently without personal experience. The powder is to be reapplied at short intervals. Cocaine has naturally come into use, either by application to the surface of the sore or by injection around the borders of the ulcer by a hypodermic syringe. The danger of establishing the cocaine habit must not be overlooked. One such case has come under my own observation. A lady for a painful ulcer under the right side of the tongue began the use of cocaine, and when seen was using thirty grains a day, injecting a solution of the drug by means of a hypodermic syringe into the borders of the ulcer. The habit was confirmed, and her condition distressing. The effect upon the local sore was no less disastrous. An enormous ulcer surrounded by walls of sloughing tissue had undermined two-thirds of the tongue, whose movement was so impaired that swallowing was difficult. A dangerous amount of œdema of the glottis existed. The patient was under observation a short time, and the character of the disease could not be definitely determined. Whitehead has offered his protest against the insufficient doses of morphine often given, and gives the details of a case where the amount finally reached thirty grains a day, with evident comfort and with no disturbance of the mental power. Since the first performance of section of the lingual nerve by Hilton it has been constantly recommended by different writers for the relief of severe pain in the tongue, either from neuralgia or cancer. Stretching of the same nerve was first suggested by Le Dentu. In a case of recurrent cancer in which the anterior

half of the right side of the tongue had been removed, I exposed the lingual nerve and stretched it until it broke. Relief of pain at first was complete, but lasted only about two weeks, and was then as bad as ever. The operation is easy of performance, and a section of the nerve should certainly be removed where the pain is severe—relief even for a few weeks is well purchased at the cost of so simple an operation. Section of the nerve is likely to prove most efficient when the growth is situated well forward on the side of the tongue. Extreme and distressing salivation is said to be fully at once controlled by a section of the lingual nerve.

For the relief of salivation and fetor various mouth-washes have been advocated. Iodoform, salicylic acid, and the vapor of creasote have met with most favor. In the majority of cases of cancer of the tongue a sufficient amount of liquid nourishment can be taken without much discomfort, but in some cases, where the least movement is most painful, it is found impossible to administer the necessary food. In such cases great and sometimes complete alleviation of the suffering in swallowing can be obtained by freely painting the sore and fauces with cocaine just before the administration of food, or a soft rubber tube may be passed into the œsophagus—a simple manœuvre that the patient can easily learn to accomplish. The food should be of the blandest character and free from pepper and spice, and should be in the form of minced meats and jellies or fluid.

The following conclusions I consider justified by the foregoing discussion:

1st. Sufficient experience has been accumulated to show that the removal of cancer of the tongue prolongs life and adds to the comfort of the patient, and further affords a reasonable hope of a permanent cure.

2d. All operations should be preceded by an effort to secure thorough disinfection of the mouth and teeth.

3d. In the treatment of continued ulcers and sores on the tongue caustics are to be avoided and all sources of irritation removed.

4th. Persistent sores on the tongue should be freely removed by knife or scissors if they resist treatment.

5th. When the disease is confined to the tongue Whitehead's operation should be employed for its removal.

6th. In this operation the advantage of preliminary ligature of the lingual artery is not definitely settled, but the weight of authority is against its necessity.

7th. The advantage of leaving one-half the tongue in unilateral disease must be considered undetermined, but the weight of positive experience is in its favor. In splitting the tongue into lateral halves Baker's method of tearing through the raphe should always be employed.

8th. A preliminary tracheotomy adds an unnecessary element of danger in the removal of the tongue in ordinary cases.

9th. When the floor of the mouth has become involved or the glands are enlarged, Kocher's operation should be performed, omitting the spray and preliminary tracheotomy.

10th. Removal of the glands by a separate incision after the removal of the tongue must be considered insufficient.

11th. Volkmann's method still rests on individual experience. Its just value cannot be determined until it has been subjected to trial by a number of surgeons.

12th. Thorough and complete removal should be the aim of all operations, whether for limited or extensive disease.

13th. By whatever method the tongue is removed the patient should be up and out of bed at the earliest possible moment, and should be generously fed.

DISCUSSION.

Dr. David W. Cheever, of Boston.

The most interesting question is, of course, in regard to diagnosis. Of late years, especially since the death of General Grant, every one who has had any sort of a sore on the tongue has at once become alarmed with the idea that cancer was forming. I presume that for two or three years after the publication of his case every one saw patients with sores in their mouths supposed to be cancers.

The most common form is the dyspeptic ulcer. This is easily recognized from the fact that it heals and appears in successive crops, and is never indurated. Although it is situated often on the side of the tongue near the anterior pillar of the fauces, still it is in the form of small soft spots which can be made to heal, but others continue to form until the health is restored.

Then comes the second more common form, that due to syphilis. This occurs in the middle of the tongue, more commonly in the form of a gumma, breaking down and ulcerating. It occasionally forms on the side of the tongue. The previous history will sometimes be of service. In doubtful cases it is proper and necessary to give two weeks' mercurial treatment before determining whether or not operation is required.

Finally come two other classes, one of which may be cancer and the other lupus. Lupus, or tubercular disease of the tongue, is not so common as cancer. It is difficult to recognize with the microscope, for the test of finding the bacilli often fails. I have known it to fail several times, although I have known it to succeed several times. The test of tubercular ulcers is that they are separate and form and re-form, some healing and leaving scars. True cancers do not heal, but go on extending.

The formation of crops of tubercles which break down, leaving small ulcers, and infect the sub-lingual and sub-maxillary glands, is characteristic of lupus, and the fact that they occasionally heal while others re-form, will generally establish the diagnosis.

True cancer almost always occurs on the side of the tongue, and infection of the glands is usually speedy and almost always constant.

While I advise removal of enlarged glands, I cannot agree with the statement quoted in reference to the expediency of treating the neck

as one would treat the axilla in some cases of cancer of the breast, where it has become the fashion to clear out the entire axilla. The objection to this method in the neck is that there are three sets of lymphatics, and there are three locations in which the glands may be enlarged, and it is impossible to dissect out these regions without great peril to life.

With regard to the duration of the disease, I have seen a case as short as four months, but these patients frequently live for a year or a year and a half. The case which I have mentioned as terminating in four months occurred in a feeble man of rather advanced age. I think that malignant affections which involve the mucous membranes are more speedy in their recurrence and less encouraging as regards operation than malignant affections of the skin, glandular, and cellular tissues.

So far as my experience goes, cancer of the tongue and of the rectum have given about the same period of immunity before recurrence. Sometimes a useful or important life may be prolonged for four to six months by operation in cases of cancer of the tongue or rectum. I think, as a rule, that is the extreme period of relief that can be promised. I think no one would care to undertake any of these severe operations described, in simple cancer of the tongue, where no glands are involved.

I think that preliminary tracheotomy is unnecessary. I use anæsthesia only to a partial degree in operations about the mouth. The patient sits up with his head forward. During the greater part of the operation he is half etherized. His memory of suffering is so slight that I think this is better than running the risks of profound anæsthesia in operations in this region. I have tried the lingual artery for various conditions, but not for cancer of the tongue, and have not found it necessary. The object, it seems to me, of operating by incision through either side of the neck beneath the angle of the jaw, or, preferably, beneath the symphosis of the jaw in cases that are not very extensive, is that it gives the most efficient drainage. One of the great dangers of this operation is septic absorption. If we can secure drainage and a dependent orifice through which the mouth can be frequently irrigated, the safety of the patient is much enhanced.

The partial amputation of the tongue, where the disease is confined to a small spot, has seemed to be just as successful as total removal. On the other hand, total removal of the tongue is not a very dangerous

or fatal operation if carefully done. I have never seen an instance where the tongue fell back on the larynx and obstructed respiration, although I have used the guard ligature which has been described. The greater danger is, I think, that of subsequent swelling and œdema of the glottis a day or two after operation, unless we are on our guard.

Recurrence, when it takes place, always occurs in the glands, and rarely in the stump of the tongue itself.

Another point on which I wish to speak, and which, no doubt, is familiar to the other Fellows, is the remarkable recovery of the power of talking after removal of the entire tongue, so that the patient can make distinct articulate sounds and speak very plainly. Indeed, I was particularly impressed with this in the case of a young man on whom I operated several times for lupus, and finally succeeded in checking the disease only by amputating the entire tongue. This was several years ago, and was followed by perfect recovery. He has also recovered his speech. He is in active practice as a physician, and apparently talks as well as any one.

Dr. L. McLane Tiffany, of Baltimore.

I shall speak more especially of the operative procedures which have already been referred to. The diagnosis, etc., need not occupy us. I think that we should draw a line between operations which involve the anterior portion of the tongue, which are generally matters of small moment unless the glands are involved, and can be done through the oral orifice, and those operations in cases where the disease has begun more or less back toward the base of the tongue. In these cases, especially if there is glandular enlargement, we have to choose the operation best suited to the condition. My own preference is very much in favor of dividing the jaw. I have had infinitely more comfort in dividing the jaw, either in the middle line if I do not find very much involvement, or below one condyle if the involvement is great. It is my habit to remove the glands when they are affected. It is a question whether or not it is proper to open the space beneath the jaw and remove the glands there found, even if they should not be involved. We do it in the axilla, but we do not do it in the anterior mediastinum, and we do not go above the clavicle in amputation of the breast. We attempt to cut off one avenue of infection, that by the axilla. I think that it is wise to imitate this in the case of the tongue, and cut off one of the routes of systemic infection. I am

inclined to clear out this space, for, although I may not find enlargement with the finger, after incision I am apt to find indurated glands that escaped my sense of touch before the skin was opened.

The future outlook for the patient is not good. Where the posterior portion of the tongue is involved permanent recovery is rare, and where the glands are involved still more rare. In my hands the results have been better where I have divided the jaw, cleaned out all that was near the diseased structure, and gave drainage below.

I object to the division of the cheek. Nothing is easier than to expose the tongue by dividing the cheek. By cutting everything back to the fauces it is possible to expose the entire tongue, but the patients do not do well. It is my habit not to sew up the incision below the jaw. I wire the jaw, and perhaps pass a small apposition suture, but my rule is to leave the incision open to give ample opportunity for drainage. This has given me better results than the intra-oral operation.

The position has been referred to. I operate with the patient lying down on the side, with the head toward the edge of the table. I thoroughly anæsthetize the patient with chloroform. The necessity for the continuous inhalation of ether, which is often required, interferes with the operation, and therefore I do not use it. I employ chloroform, and give it to the extent of keeping the patient quiet and rendering him insensible to pain. It is my impression that in a certain number of cases ether is irritant to the respiratory mucous membrane. It is certainly in a larger number than is chloroform. I am inclined to think that chloroform is better in these operations where there is danger of pneumonia. With the patient lying on his side the pharynx is higher than the mouth, and there is no drainage backward.

Another point is, that where bleeding occurs it is not necessary to tie the vessel. In the few cases where this has occurred I have put on a pair of forceps and left them there for twenty-four hours, and that was the end of the bleeding.

A point to which the essayist did not refer is in regard to tubercular ulceration. Where the tongue is excised for tubercular disease, although the patient is dying of phthisis, the ulcer will generally heal. I have made a flap operation, the wound has healed nicely, and the patient has been rendered comfortable, but dying later of phthisis. In one case the patient lived four months, and in another five months, and the cicatrix did not reopen.

Dr. T. F. Prewitt, of St. Louis.

The operation to be selected in cancer of the tongue will depend largely upon the position and the extent of the disease. If it be limited to the point or side of the tongue, an operation through the mouth is amply sufficient. If the floor of the mouth be involved, and the disease extend out to the bone, we have to do something more. In one or two instances I have resected a portion of the jaw. The periosteum was so much involved that I was confident that it was utterly useless to leave it.

I think that no surgeon need be apprehensive of death from primary hemorrhage. I think that we can control this at the time of operation. I have tied the lingual artery, but do not think it necessary. It requires a little time, although I am told that a well-known German surgeon occupied two hours in tying that artery. I have had one death from secondary hemorrhage in a man forty-five or fifty years of age, who had been a free drinker, and it was suspected had disease of the arteries. He was very plethoric. I had removed the whole tongue. He went along very well, although he presented one symptom which has not been referred to—that is, marked accumulation of mucus in the larynx—thick, ropy mucus that almost suffocated him. This gave a great deal of trouble, and I have seen the same thing in other instances. It had to be removed with sponges on sticks, and this he learned to do himself. He also learned to feed himself, and introduced the tube without difficulty. On the eighth or ninth day I received a message to come to the hospital, that the man was bleeding. When I arrived he was almost moribund. I removed the dressing of iodoform gauze and found the vessel, the left lingual, but he died a few minutes later. On examining the artery I found that a little opening had occurred just behind the ligature, and that there was no clot whatever in the artery.

There are one or two points in regard to diagnosis. I have met with one case of chronic abscess of the tongue which might have been mistaken for cancer, as it is unusual to have abscess of the tongue in a man forty-five or fifty years of age. This was in the centre of the tongue. I punctured it, and let out a quantity of pus. In another case, where a gumma had appeared, there was an obscure history of syphilis, and the diagnosis was promptly cleared up by treatment. In each of these cases the lesion appeared as a hard nodule.

Dr. W. H. Carmalt, of New Haven, Conn.

I have operated a few times for cancer of the tongue, and have found great advantage in the tracheotomy, particularly in the subsequent care of the case; the point being that patients more frequently die from some form of septic pneumonia than from the immediate effects of the operation. They die from the inhalation of the products of decomposition in the mouth oftener than from hemorrhage. I have made the tracheotomy, therefore, not so much for preliminary use—for, although it facilitates the operation it is not necessary—as for the subsequent treatment. It is of the greatest importance to have a clean respiratory tract, cutting off the route by the fauces by a packing of iodoform gauze and compelling the patient to breathe through the tube.

The preliminary tracheotomy also facilitates the administration of ether to such a degree that I should advise it for the sake of the operation itself, even if I closed it up afterward. By packing the fauces with a carbolized sponge forced well down, the entrance of blood into the larynx is prevented; the ether is given from a small sponge held over the mouth of the tube, out of the way of the operator, and there is no coughing or other interference with the operative procedures.

That this is an advantage was well illustrated in the last case on which I operated. The patient appeared to be doing so well, without any rise in temperature, that at the end of the fourth day I removed the tracheotomy tube and allowed him to breath through the mouth. The next day the temperature went up to 102°, so I immediately reintroduced the tube and packed the fauces. In the next twenty-four hours the temperature went down to normal, and there was no further trouble.

I beg to say further in regard to that case, that the cancer was far back, involving one side of the tongue and extended to the jaw and fauces. I thought it better to do the Kocher operation, which I strongly advise where the glands are involved. It facilitates the clearing them out, and the operation is by no means so awkward and difficult as through the mouth. As to the preliminary tying of the lingual artery, in the case in which I did it I operated through the mouth, and I was astonished at the want of hemorrhage; I do not believe that a drachm of blood was lost. It was nearly as dry as operating on a cadaver.

In reference to feeding, I find that patients bear the continued

presence of the œsophageal tube better than its frequent introduction. I introduce the tube, leave it there, and pack iodoform gauze around it; when meal-time comes the milk is poured down the tube. One man who had experienced a great deal of suffering previous to operation, from the difficulty of swallowing, spoke of being in a small heaven.

Dr. Robert F. Weir, of New York.

I have had occasion to do this operation by the Whitehead method five times, and by the Kocher method five times, and I have removed one-half of the tongue by the Whitehead method in ten more cases. The indications given by Dr. Dandridge are those which I follow. Where the glands are not involved and the floor of the mouth not much implicated, I prefer to operate by the mouth. I put a string through each side, separate the tongue, snip away one-half until I strike the artery, which is readily secured, and that half is finished. The other side, if involved, is treated in the same way. Sometimes the mere traction on the undetached portion is sufficient to hold the whole tongue forward, but I sometimes put a tenaculum in the stump of the first half removed, to hold it more readily when extirpating the second half.

Where the floor of the mouth is attacked or the glands are enlarged, as shown by examination with one finger in the mouth and the other outside, I prefer Kocher's operation, not only because it enables me to remove the affected glands, but because it enables me to hunt for enlarged glands which cannot be detected in the ordinary examination. In two of the Kocher operations I cut down along the anterior and posterior borders of the sterno cleido-mastoid muscle, and in both situations I found enlarged glands. In one instance I could not detect these by palpation, while in the other case I could detect them prior to the operation. In both instances, however, they could be readily recognized through the initial operation wound. I think that it is good surgery, and shall, myself, where I find any indication of gland involvement in the submaxillary space, make incisions in these situations and hunt for these glands. The recurrence occurs in the gland-structure; we rarely have recurrence in the tongue. I do not think that the removal of these glands adds to the risk of the operation.

In Kocher's operation I have preferred tracheotomy. If there is sufficient time I do the tracheotomy a few days before the operation

on the tongue. I think that this is a great advantage both at the time of the operation and in the after-treatment.

I wish to add my testimony to the value of Whitehead's solution of iodoform and compound tincture of benzoin. I not only swab it over the wound but moisten the gauze with it. I also use it elsewhere.

In Kocher's operation I have not found it necessary in removing the entire tongue to tie the lingual artery by a separate incision on the other side of the neck. By drawing down the tongue you can usually readily secure the artery either through the wound or through the mouth, which at this stage is somewhat opened.

Dr. A. G. Gerster, of New York.

I only wish to add my testimony to several of the points which have already been emphasized in the discussion, but which also have been rejected by several of the speakers. It therefore seems desirable that each should express his opinion. My experience extends over nineteen cases of extirpation of the tongue of various extents. Speaking generally, I can say that the more thorough-going and the more radical the operation the more satisfactory is the result as regards freedom from relapse. In every one relapse has been observed. I do not expect anything else.

With regard to removal of lympathic glands, I must say that in not a single case where there was no positive evidences of involvement of the glands on palpation have I cut down without finding that the glands were undeniably affected. I believe that it is a necessary corollary of our experience in cancer that the affected glands in cancer of the tongue should be removed.

I advise preliminary tracheotomy. My experience includes a very disagreeable case of removal of the tongue which was extensively involved, and in which the floor of the mouth and one of the pillars of the fauces were also affected. The patient was anxious to be relieved, as he had a large family depending on his efforts. I consented to do the operation, but did not do a preliminary tracheotomy for external reasons. While the operation was proceeding, with the patient in a semi-anæsthetized condition, which is one of the most disagreeable things with which an operator has to contend, respiration suddenly stopped. The patient was apparently dying of suffocation from a clot in the larynx, and tracheotomy had to be done. The man had a short neck, with a strongly-developed isthmus of the thyroid gland, and the few min-

utes that elapsed between the first symptoms of stoppage of the respiration and the opening of the trachea seemed to be days. It was an exceedingly disagreeable experience. Fortunately, the man recovered and the operation was completed. Since that time I have always used the tracheal tube with packing above. With that the operation can be thorough. I do not fear hemorrhage, and remove everything that is necessary. Respiration cannot be embarassed. The influx of blood cannot become a source of danger, and you are more apt to do a thoroughgoing operation, as the patient is fully anæsthetized and your whole time can be given to the operation without interruption. In this, as in every other region of the body, thorough operation requires thorough anæsthesia.

Dr. T. J. Dunott, of Harrisburg, Pa.

I believe this is the third time that this subject has come before us for discussion. In the discussion of to-day points have come out which presented themselves to me in the consideration of my case. This case was one of two years' standing; the tongue was immense in size, protruding several inches from the mouth; the mouth widely distended; the upper surface of the tongue largely ulcerated, and the mucous membrane much thickened. I thought of hemorrhage, and removal of the organ was requested. It seemed that tracheotomy was the only method to avoid the result of hemorrhage. The tongue was so large that the commissures of the lips were pushed back to the ears. I thought that after dividing attachments of the tongue to the floor of the mouth I could apply a rubber tube; and to aid me I had some needles made about six inches long—some curved and some straight. The patient was then anæsthetized with chloroform. These needles then passed through the tongue crosswise and transversely, and the rubber tube passed around and around after the floor of the mouth was divided, thus forcing the tongue forward. I then removed the tongue and pared away the diseased tissue with scissors and knife, sewing the flaps together. The patient is living to-day with a tongue sufficiently good to enable her to talk with distinctness.

Dr. Joseph Ransohoff, of Cincinnati.

My experience has been somewhat unique. My successful case was my first one—that of a man sixty-five years of age, on whom I operated by the Baker method, dividing the tongue in the middle and

using the écraseur. For four and a half years there was no relapse. The glands were not removed. There was then recurrence in the cicatrix. A second operation was made, and for two years the man lived without recurrence in the glands. There was slight recurrence at the site of the cicatrix; but the man died, not from the malignant disease, but from some acute intercurrent affection. The fact that all these cancers of the tongue do not recur in the glands primarily is to me settled. Those that have recurred in the glands have also recurred in loco. We find analogous conditions elsewhere. It is not just to compare these cases with malignant disease of the breast. I would rather compare them with epithelioma of the rectum. Here recurrence is almost always in the local position, and not in the glands higher up.

In those cases, even where we make the Whitehead operation, we have an opportunity to examine the glands through the incision. I have not made many excisions of the tongue—possibly five or six, and in no case have I had such a result as in the first instance. In every case where I did not do the Kocher operation I made an incision along the submaxillary triangle, in order to put in a drainage-tube as large as my finger. This incision affords an opportunity of examining the glands, and the gland can be removed through the opening, or the incision enlarged if necessary. The important thing is that the large drainage-tube be pushed up to the floor of the mouth, and if the patient sits up the fluid secretions will naturally run down into the dressings.

I am sorry to have to acknowledge that since that first case I have had none which has lived more than a year and a half; and, looking at those cases which have not been operated upon, I doubt whether the results obtained have justified me in the operations I have done. The first case was so satisfactory that I made every effort to duplicate it, but I presume that I shall have to work a long time before I meet with one so successful.

Dr. Dandridge: So far as I can judge from what has been said the opinion seems to be that the removal of the tongue should be by a cutting operation. No one has advocated the écraseur. I am rather surprised at this, for, although it is being discontinued, it is still strongly advocated by some English surgeons. I think that it is a decided step in advance to discard it.

I have been much impressed by what has been said by the speakers

who have advocated tracheotomy. In looking up this subject I was impressed with the fact that it was not necessary; but what has been said to-day has shown that there are advantages in this procedure, and that it may be the determining factor in the prevention of a fatal septic pneumonia. One of the questions of practical importance to decide in the removal of the tongue is the necessity or non-necessity of previous tracheotomy.

The after-treatment is an important matter. Surgeons do not seem to have settled upon any definite plan as being entirely satisfactory. The conditions to be obtained are the rapid and thorough removal of discharges from the mouth, and keeping them pure and sweet. Billroth's method does not seem to be generally accepted, and it has not prevented entirely septic pneumonia, and in one case the dressing was swallowed. The methods which have met with most favor are the frequent removal of the discharges and the keeping of the patient up and about, and not in a recumbent posture. This seems, in the hands of more recent operators, to have had an important influence in the prevention of subsequent septic infection.

CONDITIONS DEMANDING EXCISION OF THE GLOBE OF THE EYE.

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In the division of labor which to-day exists in the medical profession, as well as in so many other fields of labor, the question of the propriety of enucleating an eye will be referred to the specialist in ophthalmology more often than to the general surgeon, and in most cities there are specialists to whom cases involving a more or less chronic course will be almost invariably referred; but there are cases of emergency in which we are called upon to act promptly, and our advice is liable to be asked in consultation in other cases, and it is neither a justification nor an excuse—though much too often advanced, as if actually praiseworthy—to say "I don't pretend to know anything about eyes." Those of us who heard the admirable introduction to his address of the renowned President of the Congress of American Physicians and Surgeons, at its late meeting in Washington, will not soon forget the eloquent warning he there gave against the dangers of a too great tendency to specialism in medicine. It is in this view, rather than that I have anything novel to offer, that I respond to the request of the committee and speak of the conditions demanding excision of the globe of the eye.

In the consideration of this subject, we are at once confronted with it from the two quite different standpoints, according as we have to deal with blind eyes or with those in which there is a more or less useful degree of vision. I shall speak of them separately, and *first*, as to blind eyes.

In these cases the objections to the operation are two: first, the dangers of the operation *per se;* and second, the cosmetic appearance. The operation has been followed by death from meningitis —before the days of antisepsis more frequently than at present— but the possibility must enter into consideration now. I am not aware of this untoward result in other conditions than in suppurative panophthalmitis, but it has occurred in these cases when operated upon in the acute stage sufficiently often to make us well hesitate before undertaking it. I have had one such experience in a man about eighty years of age, who lacerated his globe by a blow from a stick of wood in chopping, and who applied to me only when suppuration of the interior of the globe was well advanced. My advice for *immediate* excision was not followed, but forty-eight hours of continued intense suffering brought about a change of mind, and although I used all the antiseptic precautions I thought justifiable short of the entire cleaning out of the orbit, he died forty-eight hours later of a suppurative meningitis.

Suppurative panophthalmitis is due to septic infection. A traumatism of some kind, be it a foreign body driven into the globe, a lacerated wound from a blow, or the clean-cut incision of a surgeon's knife, is the usual medium of contamination. Thereby the entrance of microörganisms of suppuration into one of the most fertile culture media that exists is secured, and the result is a rapid disorganization of all the interior structures of the globe. Intense pain, partly but not wholly due to the inelasticity of the sclera, but the greater dangers of extension of the inflammation and the invasion of the orbital tissues with bacteria demand the relief which only the excision of the globe will secure. In order to reduce the suppurative process to the shortest possible period of time, the removal should be made as soon as the evidence of pus is unmistakable, before the patient's strength has been reduced by the pain, loss of sleep, and increased temperature. If we wait until the inflammation has penetrated the sclera and the orbital tissues have become infiltrated with microörganisms, the operation, which before this would have been one of comparative freedom from danger, now

becomes serious—so much so that in pre-antiseptic days it was regarded as improper to operate upon panophthalmitis at all by so great an authority as v. Graefe. Even now, with the methods at hand of combating sepsis, it sometimes becomes impossible to guard against the extension of the suppuration along the lymph channels of the orbit to the brain, as the case I have just related shows. In this case, as in one of v. Graefe's and in some others, with like fatal terminations, the patients were of advanced years, and how much a sclerosis of the arteries may have had to do with the extension of the disease to the interior of the cranium I cannot say; but, as there are cases of death from the meningitis without the operation, it is not unreasonable to insist that the operation is better done either before suppuration occurs in cases of lacerating or penetrating wounds with loss of vision, or as soon as the evidences of suppuration are sufficiently plain for us to know what is coming. In early stages it is an operation of comparative innocuousness, in the later it threatens the life of the patient.

There is no one condition for which eyes are so frequently excised as in sympathetic ophthalmitis (threatened or actual), a disease first accurately described in 1844 by Mackenzie, of Edinburgh, and of which, so far as I know, there is no analogue in our catalogue of the evils to which flesh is heir. It is defined to be "an inflammation of an eye *caused* by a preëxisting inflammation in the other." (*Ref. Handbook of the Medical Sciences*, vol. vi. p. 693). In 1857, Pritchard, of Bristol, England, first remarked upon the relief of the inflammation of the fellow (second or sympathetically affected) eye which followed the removal of the injured or diseased (first affected) eye, and since his advocacy it has been a recognized surgical procedure for therapeutic purposes in suitable cases. How wide are the differences of opinion as to it applicability may be gathered by comparing the utterances of Schweigger, of Berlin, and of Mauthner, of Vienna. Some thirty years ago, the former, in consultation in a case of injury by penetration of a foreign body into an eye, in reply to the inquiry if it would not do to wait for the ophthalmoscopic evidences of sympathetic disease in the

second eye before enucleating the injured one, said to me, "When you *see* anything wrong in the fellow-eye it is already too late" (to save it). In 1878, Mauthner wrote: "Hecatombs upon hecatombs of eyes have been sacrificed upon the altar of prophylaxis to the second eye; the spectre of sympathetic disease has been a philanthropic mantle covering the acquisition of pathological material." And while I repudiate the slur of the last sentence, which I believe that brilliant writer used for the purpose of exciting attention rather than to state a fact, it certainly shows two things: first, that the disease is regarded with dread by those who have it to treat; and second, that the removal of the offending eye (the exciter) is thoroughly believed to have a useful therapeutic effect upon the disease in the fellow-eye (the sympathizer).

The exact pathology of the sympathetic process is still a matter of controversy—reflecting the medical thought of the day. When the great Scotch ophthalmologist first described the disease from a clinical standpoint, he called it "reflex," and regarded it as being propagated from the injured or diseased eye to the fellow along the optic nerve. In 1859, Heinrich Müller, as the result of anatomical investigation of diseased eyes, claimed that the ciliary nerves were the medium of transmission. In 1878, Mauthner suggested, without insisting, that the bloodvessels were the connecting link in the chain of communication (though in justice to Mackenzie, it should be said that he had also made the same suggestion thirty-five years before). During the last decade, Leber, Berlin, and others, but particularly Deutschman, have investigated the subject from a bacteriological point, with the result of convincing themselves, at least, that the process is infective, and that the optic nerves and their sheaths are the channels by which the microörganisms gain access to the second eye. You will doubtless willingly pardon me if I avoid entering at length in to this field of discussion. I have referred to it at greater length in an article in the *Reference Handbook of the Medical Sciences*, and Dr. Robert L. Randolph, of Baltimore, has given the subject a thorough investigation in the pathological laboratory of the Johns Hopkins University,

publishing his results in the *Archives of Ophthalmology*, 1888, vol. xvii., No. 2, to which I must refer those who wish to pursue the matter further. Suffice it here to say, that to my mind the pathological investigations of the infectious character of the disease are not convincing, and the clinical features are altogether in favor of the view advanced by Heinrich Müller, of the ciliary nerve medium of transmission; and further, the particular subject of our discussion from a therapeutic standpoint bears out this view better than any other. If the "sympathizer" be affected by reason of the actual presence in it of microörganisms, let the channel of communication be either the blood vessels or the optic nerve, I cannot understand how the excision of the first affected eye, the "exciter" could stop the process or indeed work any benefit whatever, though in a large number of cases this effect is undoubtedly accomplished.

The beginning of sympathetic disease is usually slight and insidious, though occasionally it is ushered in by a violent and uncontrollable outbreak, which goes on rapidly to the destruction of the organ. In most instances the first symptom is difficulty in using the eye for near work—"it tires easily"; this is soon followed by evanescent attacks of subacute inflammation with pain and slight tenderness, passing off on rest, and by the laity described as "taking cold;" the pain becomes more constant, the tenderness on pressure increases, flashes of light become troublesome. If the eye be now touched carefully with a probe around the cornea in the region over the ciliary body, an area of supersensitiveness will be elicited, and it is claimed (Bowman) that this is always at a point corresponding to the initial seat of irritation in the other eye (exciter). While there may be a question of this occasionally, it is the fact sufficiently often to be the rule, and has its bearing in the consideration of the medium of transmission of the disease *via* the ciliary nerves.

In a case presenting the symptoms above described with the other eye lost from injury or certain forms of disease yet to be mentioned, it is the duty of the surgeon to advise, in the most unqualified manner, the enucleation of the blind eye. You appreciate that the symptoms enumerated indicate a condition

of irritation only; there is as yet no impairment of the special and peculiar function of the organ; no actual loss of vision, and it is in this stage that we look for the best effect of the operation. In most cases, if the source of the irritation—*i. e.*, the blind eye itself—be *now* removed, we may reasonably anticipate a favorable effect on the sympathizing eye; the irritation subsides and the eye continues to perform its function without impairment.

This irritative stage is, however, usually short, a matter of days (although exceptional instances are on record where it has lasted months, even years), and it is more or less rapidly followed by a diminution of vision, the cause of which being recognizable in an organic lesion. This is usually an iritis of the plastic variety, though it may be serous, or a cyclitis, or a choroiditis, or (and very rarely) even a neuro-retinitis; in either case there is an actual inflammatory process with production of new-formed material; the condition has passed beyond the irritative stage and is now vastly more serious because of the intractable nature of the process set up. In plastic iritis the effusion of lymph goes on to the blocking up of the pupil, of Fontana's space, covering the lens, dragging upon the ciliary processes, invading the choroid, and terminating in detachment of the retina and disorganization of the vitreous. The serous iritis is liable to take on glaucomatous inflammation, with the degeneration so fatal to vision characteristic of this disease. The lesions of the choroiditis and neuro-retinitis are the effusion of plastic lymph in these structures. It is thus seen that, except in the last-mentioned disease, the sympathetic disease is an inflammation of the uveal tract to which the ciliary nerves are distributed and the distribution of the optic nerve in the sympathizer is almost never affected—indeed, it has been strenuously denied by some observers of large practice that a true sympathetic neuro-retinitis ever occurs, and they hold that this fact is an evidence against the optic nerve medium of transmission from one eye to the other, but when careful observers (E. G. Loring, Knapp) state that they have seen the beginnings in this form, negative evidence goes for little except as to its infrequency. In the acutely inflammatory stage of the sympathetic disease the re-

moval of the "exciter" is not so beneficial to the sympathizer; indeed cases are unhappily frequent in which the operation has been positively harmful, adding fuel to an already flaming fire; and yet it is difficult, in view of the want of success of other means of combating the disease, to make up one's mind to decline to do the one thing that in an earlier stage has proved itself to be the most potent single remedy or procedure that we have for treating it. But we must wait until in some way, and it is beyond the province of this paper to discuss how, we have subdued the active process, when, in period of quiescence to the sympathizer, the exciter may be removed in the hope of preventing another attack.

We must also bear in mind that in a very small number of cases (about 10 per cent.) the sympathetic inflammation may come on *after* the removal of the exciter, and in about 2 per cent. it was thought by a committee of the Ophthalmological Society of the United Kingdom, reporting in 1886 upon 200 cases of this disease, in *consequence* of the operation, both eyes having been quiescent previous to the operation. While the large majority of cases are shown to be benefited by the excision of the exciter, there were a certain very limited number in which we must remain doubtful as to whether the operation was the best thing that could have been done.

The conditions liable to give rise to sympathetic ophthalmitis are as follows: 1. Injuries. 2. Diseases. Of the injuries: *a*, lacerating or perforating wounds so severe that the ultimate result will inevitably be atrophy of the globe; *b*, the lodgment of a foreign body in the interior of the globe; *c*, a penerating wound involving the ciliary region, *i.e.*, the periphery of the iris, or ciliary muscle in the cicatrix. Of the diseases: *a*, recurring or chronic irido-choroiditis, from whatever cause; *b*, atrophy of globe, following purulent keratitis or panophthalmitis, and in which ossific degeneration of the retina has taken place; *c*, atrophy of the globe, from any cause, with a painful ciliary region.

It must also be further borne in mind that in none of these conditions does time confer any immunity against sympathetic

disease. So long as the irritation exists it is a menace to the other eye. I have had in my practice sympathetic disease starting up thirteen years after the receipt of an injury, and others have reported much longer periods.

There is considerable difference in liability to the disease in the various injuries and diseases. In the first place, this sequence is more frequent after injuries than non-traumatic diseases, and of the injuries nothing is so potent as the lodgment of a foreign body in the eye, assuming, of course, that the organ escapes the dangers of septic infection as the immediate result of the penetration. That septic infection or bacterial growth have nothing to do with the propagation of the disease, witness the almost surety of sympathetic disease that follows the dislocation of a crystalline lens, whether accidental from a blow without rupture of the globe, or intentional, as in the operation for couching — a consequence so certain that the operation has been abandoned.

The pain which comes from the intra-ocular pressure of a chronic glaucomatous degeneration is frequently so excessive as to justify the removal of the offending organ, other means for the treatment having failed.

Of late years the opinion has more than once been expressed that a glaucoma may be occasionally a sympathetic disease, *i. e.*, the glaucomatous process in the second eye being aroused and *caused* by a similar process in the eye first affected. I fail to see more than a coincidence, *i. e.*, the not altogether unusual appearance of glaucoma in the two eyes chronologically consecutive. The results of operative interference do not establish a *prima facie* case either, inasmuch as the gravity of the situation has uniformly induced a double operation, viz., the enucleation of the first-affected blind eye and the performance of an iridectomy on the other; and whilst the enucleation is entirely justified, indeed demanded, we are without data as to its actual value as a therapeutic procedure.

Various diseases of the eye leave the organ in conditions so inconvenient or repulsive in external appearance that the surgeon's aid is sought, for purely cosmetic purposes, to relieve the

deformity, which is at once unpleasant to the looker-on and a mortification to the patient. A suppurative keratitis has left a staphyloma of the cornea projecting so that the lids cannot close over it. A hydrophthalmia has resulted from an irido-choroiditis of intra-uterine or infantile life; it may be a uniform enlargement of the whole globe, or it may have caused scleral staphylomata of irregular shape around and behind the cornea; these are both disfiguring and (remotely) liable to set up a chronic irido-choroiditis, with sympathetic dangers. There may be a disfiguring opacity of the cornea without staphylomatous projection, and also in dermoid cysts of the conjunctiva covering the cornea. The question of enucleation of the globe comes up in all of these conditions. Are there, however, no procedures that may be substituted, and avoid so severe a mutilation? In the early days of modern ophthalmology, viz., the sixties, abscission of the anterior segment of the globe, more or less extensive, with stitching of the margins of the wound together (more or less evisceration of the contents of the globe being an inevitable consequence), was frequently performed, the opinion being that by leaving a large part of the globe for the muscles to act upon, a freer movement would be communicated to an artificial eye placed over it, and the mutilation be less noticeable. As a matter of fact, however, the result is about the same—the sclera collapses later, the globe shrivels down to a mere knot, and the difference in motion is inappreciable; while sympathetic disease has occurred from the implication of the ciliary nerves in the cicatrix. One such case is enough to condemn the operation. The cosmetic advantage, if it existed, cannot be weighed in the balance against sympathetic dangers. My opinion is decidedly against any of these risky procedures. Enucleation of the misshapen eye, with the introduction of an artificial eye, is the only admissible operation. The modern expedient of tattooing a white cicatrix of the cornea without staphyloma has resulted in sympathetic disease.

The enucleation of blind eyes that are the seat of phosphenes so intolerable as to affect the mental calibre of the patient has been done; but, like so many operations undertaken to relieve

a symptom of nerve irritation, with doubtful utility. It is quite as likely to be due to nuclear irritation as to peripheral. The case is usually better treated in some other way.

In regard to the enucleation of eyes only partially blind, it goes without saying that a condition of things which can allow it to be seriously contemplated must apply with greater force to eyes already blind. The chances of accident or independent disease to the remaining eye are sufficiently great to justify the statement that nothing short of the certainty of ultimate blindness to both, or of death, can permit one to consider such a procedure.

Most of the intra-ocular tumors are sufficiently dangerous to life to demand the removal of the organ in which they are contained as the only hope that can be entertained of successfully combating their encroachment. They are of two classes: the granulomata and the sarcomata. The former are not usually suitable for surgical interference; the latter are. These are glio-sarcoma of the retina, and the sarcomas, melanotic or otherwise, of the uveal track. They are frequently detected by the ophthalmoscope (sometimes without) before they have entirely destroyed vision, and should be removed at the earliest possible moment; and while, if left until they penetrate the sclera and invade the orbital tissues, they almost surely recur and cause the death of the patient, their successful removal with the globe has demonstrated that the most malignant of growths are, in their beginnings, capable of safe and permanent extirpation. Three years ago next month I removed both eyes of a child of two and a half years of age for a glio-sarcoma in each, and the child is still living, well, and healthy. It is true that this case does not accurately speaking, belong in this classification, inasmuch as the child was entirely blind; but, as it shows that an advanced case can be saved, the application to one less advanced is evident. Before the penetration of the sclera they are veritably encapsulated and comparatively safe for removal; but no one can say how long they will remain so, as it is only a question of time as to when they will break through this barrier and generalize. I

regard them as preëminently the most malignant growths that exist; hence the advice.

Extra-ocular growths are of greater variety of histological structure. Besides the dermoid cysts already mentioned, sarcomata of the orbital tissues in both children and adults, and carcinomata of the conjunctiva in adults, occur. The latter may be removed with the globe with a fair prospect of non-recurrence, if the growth has not already spread to the palpebral conjunctiva or beyond.

Sarcomata of the orbit, even when not attached to the globe, frequently require its removal in order to get at the whole growth. These are very sad cases. The eye is perfectly good, and it is difficult to persuade the patient, or family, of the gravity of the situation until too late to secure immunity. Not only does the globe require removal, but the entire orbital contents must be extirpated down to and sometimes including the periosteum.

There still remains to consider whether an eye which contains an appreciable degree of vision should be removed in order to avert a threatened or prospective attack of sympathetic disease in the fellow.

When we consider the extreme obstinacy of the sympathetic disease, its usual steady progress to total blindness, under the best directed and most active treatment, it is a point of great importance to determine if it be not our duty to take every precaution against either the onset or the progress of the disease. It was to this class that Mauthner inveighed in the quotation given in the beginning of this paper, and it is quite possible that some eyes have been unnecessarily removed for fear of something that was too remote. It is certainly unjustifiable to remove an injured but still seeing eye, though it may be an exciter of sympathetic disease. The result of the operation undertaken after the disease has begun has not been sufficiently successful in arresting the progress of the malady to warrant us in advising the operation, especially as there are many cases on record in which the little that remains of sight in the injured or exciting eye was all the patient had left after an attack of sympa-

thetic ophthalmitis. The eye secondarily affected having gone on to total blindness, the primarily injured one keeping what it had, serving to go about with. The only condition in which I can regard the removal of a still seeing eye justifiable for fear of sympathetic disease is where the foreign body remains in the eye. In these cases the sympathetic disease is so certain to follow that I think I would prefer to run the risk of losing it in some other way.

GASTRORRHAPHY FOR DIMINISHING A DILATED STOMACH.

By ROBERT F. WEIR, M.D.,
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In December, 1889, I had occasion to perform a gastro-enterostomy in a patient aged forty-one, for the relief of a stenosis of the pylorus of two years' duration, and associated with the usual symptoms of that lesion. The stomach at that time was distended to a degree that would admit of the reception of between eight and ten pints of fluid, and its lower level reached some three inches below the umbilicus. The opening in the stomach, after Wölfler's method, was made some two inches in length, and was accomplished by means of Abbe's rings. It was situated between five and six inches from the pylorus. Rapid recovery took place, and the patient quickly gained in weight and improved in health. The details in this case have been already reported elsewhere.[1]

A year later he presented himself again to my observation, when I learned that his former symptoms of vomiting had shown themselves. This occurred either daily or every second day, and consisted of a considerable amount of glairy mucus, mingled with undigested food. The first thought was that, possibly, the gastro-enteric opening—though made of a length which was beyond that which has been advised by Senn, and practised also by our German *confrères*—might have contracted unduly, or possibly, as has been met with in other instances, might have entirely closed; but this was negatived by the fact that air pumped into the stomach could be heard with the stetho-

[1] Medical News, December 14, 1889.

scope to pass into the intestines below, and that these latter, after a certain amount of injection of air, were found to be distended. The cicatrix of the abdominal incision was also found to have yielded and to admit in this way the occurrence of a moderate-sized ventral hernia. This was excluded as the cause of the vomiting and of the moderate distress with which the patient also suffered by the fact that the use of a well-applied pad afforded no relief.

From time to time during the year 1891 he presented himself to me for inspection, and I found he was still annoyed by these attacks of vomiting. They were temporarily relieved by washing out the stomach, but the patient was more or less incapicitated from work by the existence of these symptoms. In the early part of this year I felt that perhaps something more could be done for him. I was convinced by the exclusion of other symptoms that the still existing atonical condition of the stomach was at fault in this case; that either the opening made by the gastro-enterostomy was situated too near the pylorus to accomplish the thorough evacuation of the stomach, or that the part beyond from its great relaxation, like an atonied bladder, failed to contract and sagged downward, forming a cul-de-sac, in which the stomach contents collected. The procedure that first came to my mind was that I should endeavor to narrow the stomach by making a resection of a considerable portion of its walls. Finally I considered that a more simple procedure might, perhaps, be adopted, especially as the method proposed was devoid, in a great measure, of the risk that belongs to a removal of a portion of the gastric wall. Therefore, I determined to take a tuck in the stomach, sewing together its peritoneal surfaces, and in this way accomplish the end desired.

Accordingly, on the 9th of March, 1892, under ether, a five-inch vertical incision was made along the course of the cicatrix of the previous operation and in the centre of the existing ventral hernia, the abdominal cavity opened, the stomach sought for, seized, and drawn out of this opening as much as possible. The gastro-enteric wound was found in the situation indicated, the intestinal walls thoroughly adherent to those of

the stomach, and through the small intestine the finger could be passed by immersion of the intestinal walls into the stomach, showing that the opening into the latter organ was at least three-quarters of an inch in diameter. The intestine itself presented an appearance that is worthy of a slight note.

Opposite the gastric opening the lumen of the jejunum was increased to nearly double the usual size. This enlargement extended to a distance of from three to four inches on each side of the gastro-enteric opening, beyond this point the intestine became normal in appearance. The stenosis of the pylorus was again examined and found to be, as recognized at the first operation, of a simple character. The greater curvature of the stomach bagged downward, and was limited in its extraction from the abdominal opening now made by an adhesion along the left extremity of the greater curvature to the spleen. The end of the operation I proposed was to attach the greater curvature to the lesser curvature along the portion of the stomach to the left of the gastro-enteric opening. This was done in the following manner:

In the centre of the space between the upper and lower borders of the stomach a dimpling in of the gastric wall was made, first by pressure of a sound to a distance, say of an inch. A row of eight or ten interrupted silk sutures was now made, passing through the serous and muscular coats for a distance of from six to eight inches, and the sound withdrawn. A second series of sutures, at about one inch from the first, was again made, dimpling in an additional portion of the stomach wall, and in a similar manner; a third and fourth row of interrupted silk sutures were applied until through a distance of some four to five inches the greater curvature was applied to the lesser curvature. When this was completed a double fold of the stomach, estimated equal to the breadth of the hand and nearly its length, had been made in such a way that this projected into the cavity of the stomach. Availing ourself of the surgical interference prompted by this operation, the ventral hernia was also remedied.

The fascia posterior to the separated recti muscles had, it

was found, glued itself to the anterior fascia of this muscle. This rounding fascia was then split along the edge of the muscle, and the posterior layer thus liberated was sewn together the entire length of the wound by numerous fine silkworm-gut sutures applied about half an inch apart. They were cut short and left embedded. Then the bellies of the rectus muscle were in a similar manner sewn together by two or three stitches of a like character about an inch apart. The anterior layer of the fascia was also sewn together separately, and finally the skin.

No reaction followed this operation, the patient's stomach being kept at rest and nourishment effected by rectal enemata. On the sixth day the patient was allowed to have beef tea, subsequently beef juice, and later peptonized milk. At the end of the second week his food was gradually increased to milk and eggs, and at the end of the fourth week he was allowed the usual diet. From that time to the present he has lived in the ordinary manner as far as nourishment is concerned.

The hernial opening closed, except at the upper angle of the incision, where a slight protrusion appeared on coughing at the termination of the fourth week. Under cocaine the wound was again opened here and stitches of a similar character applied, which resulted in a cure. Since the operation he has not had once an attack of vomiting, and he has been free from his distressing feelings and he has also gained in strength and weight. His bowels have become more regular, though unluckily the condition of the urine as to quantity before and after the operation was not noted. This secretion in sundry conditions of dilatation of the stomach has been noticed to be very much lessened.

I had believed in entering upon this procedure that I was about to resort to a novelty in surgery. However, two days before the operation I learned that this very operation had already been performed by Bircher, of Aaran, Switzerland, three times during the past year for dilatation of the stomach. These cases I beg to summarize as follows:

Case I.—A man, aged forty-six, who had suffered for five years with pains in the back, which were relieved by vomiting. These attacks

lasted for days. Tenderness was experienced over the stomach. He became weaker and thinner, and on May 26, 1890, he entered the hospital at Aaran. Dilatation of the stomach was recognized reaching much below the navel. He was treated by regulation of the diet and washing out the stomach. Much undigested food, with mucous secretion, was pumped out in this procedure. Improvement took place. However, whenever the washing out was stopped vomiting occurred. He was discharged in December of the same year, but returned in January, 1891, complaining of much stomach pain. Lavage was again resumed with benefit, and he was discharged. He re-entered again for a similar disturbance in April, 1891. On July 21st of this year the operation for narrowing the stomach was undertaken. The stomach was previously washed out and carefully emptied. Parallel to the left edge of the ribs, 15 centimetres long, an incision was made and the peritoneum opened. The stomach was drawn out. The edges of the wound being pulled apart and the lower edge being pulled upward, the greater curvature of the organ was readily reached and sewn to the lesser curvature by means of thirty-five silk stitches. This was aided by laying a long forceps on the stomach wall after fixing a suture at each end of the fold so that its weight pushed inwards for the time being the stomach fold, and allowed readier suture. The stitches were passed only through the serous and muscular layers. On the lesser curvature towards the pylorus was found a suspicious hard place, the size of a walnut, but as it had been promised to the patient that the stomach itself would not be opened, operative procedure for the removal of this spot was not undertaken. The wound was, therefore, closed and prompt healing took place.

For six days thereafter nutrition was carried on only by enemata, and on the 12th day the patient was about. On the 21st day he took on his own responsibility a "beer-spree" without mishap, and from that time his health was completely restored, and he was able to work without detriment. Digestion became normal and absorption also. His urine, which previously had been very much diminished in quantity was increased. The patient's health continued good for three months, when some symptoms of stomach catarrh, with vomiting recurred. There could be then felt a resting-place over the pyloric end of the stomach. A laparotomy for the resection of the supposed involved stomach wall was advised: October 19th this operation was performed. The stomach wall near the pylorus was excised, but death resulted on

the second day. As a result of the first operation the stomach was found of normal size, the stitches had formed tight adhesions which were not easily to be pulled apart. The fold of the stomach formed at the first operation projected into the cavity of the organ nearly the same size as at the operation. The serous membranes opposed to each other within the line of union made by the stitches were only slightly adherent, so had it not been for the sutures it would not have healed together. The hardened mass removed by excision was of a cicatricial nature from a healed round ulcer. (The examination mentioned nothing of the existence of a pyloric stenosis. R. F. W.) Bircher says that as a result of the operation the dilatation was in an anatomical and physiological sense cured, and the lowest edge of the stomach was by the surgical procedure raised up fully a hand's breadth.

Case II.—This occurred in a woman, aged sixty, who for four years had signs of gastric dilatation due to muscular disability, and not from any recognized obstructive causes. No tumor was to be felt. The lower edge of the stomach reached below the navel. For this case the fold was made more vertically oblique. In the previous case the fold had been parallel to the long axis of the stomach. Prompt healing without any detrimental symptoms took place, and the patient was discharged from the hospital on the thirty-third day, with digestion normally performed, with evidence of characteristic absorption as shown by the urine and improved defecation, and with improved general health. Three months later she was seen completely well, with normal digestive functions.

Case III.—Man, forty-three years of age, who for twenty-one years had digestive symptoms. During this time blood had frequently passed in his stools. He was unable to work and had been one year on a milk diet. In October, 1891, symptoms of vomiting had become very bad. On entrance into the hospital in December, 1889, loud splashing noises were recognized. Washing out removed much undigested food. Improvement took place under regular lavage. In March, 1890, hemorrhage followed the use of the stomach-pump. Relapses occurred in September of the same year, with hemorrhage and pains in the stomach. After being a while in the hospital he was again discharged improved, but another recurrence took place in October, 1890. In May, 1891, another sojourn in the hospital. At that time enlargement of the stomach below the umbilicus was recog-

nized. Operation for diminishing the size of the stomach was undertaken 23d of August, 1891, as in the first case. Besides dilatation there was found a cicatrix on the anterior wall the size of a franc piece. After the patient's recovery from the operation there was a prompt disappearance of the symptoms of dilatation, though some signs of chronic catarrh of the whole intestinal tract remained for some little time, but these were finally relieved by Carlsbad cure, after which he remained well.

Dilatations of the stomach, it is true, are generally due to obstructive disease at or near the pylorus. This condition of enlargement is said to occur not infrequently from intrinsic causes. In either event, its repair by surgical means in long existing cases should hereafter enter into consideration. If the dilatation be associated with a recognized simple pyloric stenosis, and this obstruction be overcome by the Mickulicz-Heineke procedure—of pyloroplasty, or by the institution of a gastro-enteric opening—it may be that either at the time of the operation for the relief of the stenosis the surgeon may consider the advisability of immediately remedying the undue dilatation, or of effecting this diminution in the size of the organ more properly at a later date, when it had been shown that relief was not to be accomplished by the primary surgical procedure. This operation of diminishing the size of the stomach from the simplicity of its operative technique may be assumed to be one of comparative freedom from risk, though, of course, further experience is required to pronounce with any positiveness on such a point as this. It would seem to be applicable to those cases of dilatation of the stomach which are constantly found running to a hospital and who are only improved temporarily by the use of lavage and whose progress is associated with repeated relapses.

UPWARD DISLOCATIONS OF THE HIP.

By LEWIS A. STIMSON, M.D.,
NEW YORK.

THE following case is interesting and worthy of record as an exceptional form of dislocation, and it may properly be made a text for a few remarks upon the varying modes of production and the classification of a group of dislocations which are often described under one rubric, because of the common possession of certain clinical features, although they present distinct pathological differences:

Michael M., forty years old, was brought by the ambulance to the Chambers Street Hospital from Pier 1, North River, March 10, 1892, at 1 P.M. He had been found by the ambulance surgeon seated on the edge of a chair, with his right thigh somewhat abducted and flexed and in marked outward rotation. While engaged in unloading some heavy cases from a truck a case weighing eight hundred pounds had slipped down upon him and forced him backward against another box, and then sideways to the ground. On admission his temperature was normal, surface cool; no complaint of pain except when the right thigh was moved.

When I saw him, three hours later, he was lying on his back with the right thigh extended, slightly abducted, and so far everted that the foot rested along the entire length of its outer border on the bed. The upper anterior portion of the thigh close below the groin was rounded and swollen, and showed two incomplete transverse rents in the skin about two inches long and about two inches below the anterior superior spine of the ilium, which evidently had been caused by over-stretching of the skin. The outward rotation gave the thigh a very peculiar appearance; the bulk of the quadriceps extensor formed a longitudinal mass on the outer side between the anterior (inner) aspect and a deep longitudinal depression extending from the tro-

chanter to the side of the knee. Every attempt to move the limb caused pain and sharp contraction of the muscles.

Ether was administered. The limb could then be easily placed alongside of and parallel with the other; the shortening was two centimetres. The head of the femur lay directly beneath the skin, and could be distinctly outlined. It lay just external to a line drawn downward from the anterior superior spinous process, and its upper border was about one inch below that prominence. Internal rotation was impossible; moderate flexion was easy.

Reduction was easily effected by flexing the hip about twenty degrees, and then making moderate traction along its axis with one hand at the knee, and direct pressure downward and backward upon the head of the femur with the other. By fully extending the thigh and making slight pressure forward at the upper part of its posterior aspect the dislocation was easily reproduced, and was then again reduced as before.

Through what was apparently an extensive gap in the soft parts beneath the skin at the point occupied by the head of the femur before reduction I could distinctly feel the surface of the ilium and, a little in front, the anterior inferior spinous process.

A long side splint was applied and the patient placed in bed.

Convalescence was uneventful, and the patient was discharged April 15th, thirty-six days after the accident. May 24th he called on me; he walked without a cane, and complained only of a slight feeling of weakness in the limb. Hyper-extension of the hip caused no pain; active flexion of the hip was restricted about one-half.

Dislocations in which the head of the femur lies directly above the acetabulum are rare, and the recorded cases are very few. They are commonly grouped under the name of upward, or supra-cotyloid, dislocations, in distinction from the other groups of backward, forward, and downward dislocations; but, unlike those groups, the choice of the name is based upon the position in which the head of the femur comes to rest rather than upon the direction in which it left its socket; and the assumption so commonly found in the reports of the cases or in the description of the group, that the primary displacement was directly upward, lacks the positive clinical and experimental basis upon which our conceptions of the other forms are built. Concerning a considerable number of cases that

have from time to time been placed in this group, this assumption has been clearly shown to be erroneous. For example, in the everted dorsal dislocation the head of the femur lies above the acetabulum and the attitude of the limb is that of upward dislocations; extension, eversion, and more or less abduction; and in some of the supra-pubic dislocations, the ilio-pectineal, the head lies above the socket, and the limb has a similar attitude. These two possess the prominent clinical features of upward dislocations, but they are radically different from one another in their essential lesions, their mode of production, and their appropriate treatment; so far as these points are concerned—and they are the important ones—each belongs wholly in its own class, and should be clearly kept there, in the interest of the patients and of accuracy in classification and description.

Excluding these, there remain very few recorded cases in the class of upward dislocations, and even these differ so widely from one another in some features that the question of their essential identity cannot escape notice. Of some of them the case herein reported may serve as a type: the dislocation is produced by the action of great violence, the disability is complete, the limb is fully extended and everted, the head of the femur is distinctly recognizable above and external to the inferior spinous process, reduction is easily effected by traction and direct pressure. In others there is the same eversion, extension, and disability, and the head is distinctly, though less superficially, recognizable on the *inner* side of the anterior inferior spinous process. In a third group there is abduction, eversion, and some flexion; the patient is able to walk, and the head of the femur cannot be felt. There are only two or three recorded cases of this third group, and the histories are such that the probability of error in the interpretation and diagnosis seems to me so great that I think it would be well to discard them and to await the report of new cases observed with especial attention to this doubt.

Those of the second group, in which the head lies close below and on the inner side of the inferior spinous process are, in my opinion, cases of extreme secondary displacement outward of primary supra-pubic dislocations. At least I have

been unable in a considerable number of attempts to produce this form upon the cadaver in any way except by forcing the head out through the upper inner segment of the capsule, and then moving it outward by external rotation and adduction.

This would leave only the first group, those in which the head is distinctly recognizable on a level between the two spinous processes and external to both, to demonstrate the existence of a class of upward dislocations. Clinical observation and experiment show that the upper portion of the capsule, including the base of the Y-ligament, is torn, so that, as in the case herein reported, the head of the femur can be slipped in and out of its socket across its upper margin with great ease. It only remains to determine whether the dislocation primarily occurs at that point, or whether the rupture of the Y-ligament is effected secondarily after the head has left the socket in front of or behind the ligament.

In the first of a series of experiments recently made to reproduce this dislocation on the cadaver I forced the head through the upper inner portion of the capsule by extension and outward rotation, and then by prolonging the rotation easily detached the Y-ligament from the ilium and brought the head of the femur to the desired point. For a moment the solution of the problem appeared to have been obtained; but in none of a half dozen repetitions could this detachment be again effected; I could get only an example of the second group, the head remained on the inner side of the inferior spinous process.[1]

No attempt primarily to rupture the Y-ligament was successful; the only manipulation that held out any hope of doing so was forced extension of the hip, and this was made again and again until the anterior muscles and even the femoral artery were ruptured, but the ligament withstood the strain. When one divides it with the knife and notes its thickness and strength, it seems probable that it would stand a strain better than the femur, that the bone would break before its thick trunk would

[1] The first successful attempt was made upon a wet preparation of the bones and ligaments that had been kept for some days in a preservative solution; the others were made on fresh or half-dissected cadavers.

yield; and I can hardly believe that it could be directly torn by leverage exerted through the femur. Its rupture or its detachment would seem to be possible only by the action of some great force against the back of the upper portion of the partly flexed thigh, a force that would press the head of the femur directly against the posterior surface of the ligament and detach it successively from below upward instead of all at once. Not being able to develop sufficient force in the dissecting-room, I could not put this theory to the test of experiment, except so far as to determine the attitude of the limb after dividing the ligament at its base and passing the head out through the rent. When the rent was simply large enough to permit the passage of the head the limb could not be made to take the attitude observed clinically, for outward rotation was prevented by the untorn anterior (inner) portion of the capsule; it was necessary in addition to divide that portion before the clinical form could be exactly reproduced.

Experimentally, then, the reproduction of the dislocation either as a primary upward or as a primary ileo-pectineal, with extreme secondary outward displacement, is extremely difficult, so much so as fully to account for the rarity of the clinical occurrence, and so equally difficult as still to leave the mode of production in doubt.

In conclusion, it may be asserted that there is neither clinical nor experimental proof that the head of the femur has ever been traumatically dislocated across the upper margin of the acetabulum at the point corresponding to the base of the Y-ligament, and that there are very few cases (less than half a dozen) in which it seems probable that it did so leave the socket. Such cases alone should be classed as upward dislocations, and that only so long as it is not shown that the position has probably been reached by secondary displacement after a primary anterior dislocation.

Those cases in which the head lies above the socket, but to the inner side of the anterior inferior spine (in part the subspinous of Bigelow), belong by virtue of the primary displacement to the supra-pubic, and should be grouped with them.

CASES OF OPERATION IN SPINA BIFIDA AND ENCEPHALOCELE, WITH REMARKS.

By A. T. CABOT, A.M., M.D.,
BOSTON, MASS.

At our last meeting, Dr. J. W. White, in his able paper on "The Surgery of the Spine," speaking of the operative treatment of spina bifida, presented the conclusion arrived at by the Committee of the Clinical Society of London as that held by most surgeons of the present day. This is: "That while various successes have been reported by other methods, such as simple tapping and drainage, and more recently in a limited number of cases by excision of the sac, yet, on the whole, the method of injection of the sac offers the best prospect of ultimate recovery with the least immediate danger."

This is an opinion unquestionably justified by the facts as they stand at present.

The operative treatment of spina bifida and encephalocele by incision has always been viewed with great disfavor. Treves says of spina bifida: "These operations can only be undertaken in those comparatively infrequent cases where the sac is quite free from either the cord or any of the spinal nerves." And, again: "The *modus operandi* is of little moment. If the sac contains cord elements the result will prove fatal."

In encephalocele he says that an operation is only to be considered when rupture of the sac is imminent, and then he recommends tapping with the subsequent application of pressure.

It is to be remembered, however, that constant improvement is being made in the results of operation on the nervous system.

And many of the facts upon which these opinions were based were collected at a time when asepsis was not so generally obtained in operative work as at present.

It seems to me, therefore, important to accumulate as much recent experience as possible upon which to form our modern views of this subject, and it is as a contribution in this direction that I make a report of the few cases I have had.

Cases of Spina Bifida.

Case I.—Lillian F., aged nineteen months, was brought to the Massachusetts General Hospital on July 9, 1886. She had a tumor over the sacro-lumbar region of the spine, which was about double the size of the child's fist. The tumor was elastic, fluctuating, translucent, with a tendency to be pedunculated, the pedicle being about two inches wide. No perceptible change occurred in the tumor when the child cried. The skin covering the tumor was normal in character around the base, somewhat thinned as the summit was approached, and on the top was a small ulcerating surface.

The legs were paralyzed, and in a somewhat spastic condition, it being difficult to separate them; and the child seemed to have no control over her water. With these exceptions, she seemed in every way normal.

The history was, that at birth the tumor was about the size of a hen's egg, but that after three months it began to grow, and at the time of entrance was double the original size. The fact that the tumor was still increasing in size and beginning to show a tendency to ulcerate on the surface, together with the evidence that communication with the spinal canal was certainly not free, made an operation seem advisable.

This was accordingly done on July 12, 1886. With the object of preventing any unnecessary loss of cerebro-spinal fluid, a Spencer-Wells clamp was applied to the pedicle and gradually tightened as the fluid was allowed to flow out of the cyst. Skin flaps were then dissected up, and the tumor was cut off close down to the spine. The stump made by the division of the cyst was sewed across to and fro with catgut, and the skin was then brought together over it with silk sutures, the clamp being taken off as soon as the wound was tightly closed. The opening into the bony canal in this case was small and

could be made out with difficulty; it was certainly not larger than the tip of the little finger.

The child recovered well from the ether, although it was rather restless for a day or two. On the second day the bandages were stained with serum, and on opening the dressing it was found that this serous fluid oozed from some of the stitch holes. The wound healed well by first intention, but this leakage of serous fluid continued for more than a fortnight. It then ceased, however, and when the child was seen, more than a month later, everything was closed.

The sac of the tumor was much trabeculated, and divided into separate chambers. It being summer and difficult to get pathological work done, no proper examination was made of it. I am, therefore, unable to say whether it contained nerve elements or not. An examination was made of the fluid that flowed away after the operation, and its character was found to be that of cerebro-spinal fluid.

This case was heard from in May, 1892. The back had remained entirely well since the operation, but the child had gained no power in the legs nor any control over the urine.

Case II.—Cora W., aged four years, was seen November 26, 1887. She was a well-nourished child, fully developed, except that the legs were almost wholly paralyzed, a very slight amount of motion being preserved in the right one. She had never used them, being unable even to creep. She had full power over the bladder and the rectum; her head was somewhat large, with a bulging forehead, rather narrow, laterally. The child appeared stupid, but her parents declared her to be bright and intelligent.

Over the lumbo-sacral region was a tumor, 13½ inches in circumference at the base. As it was somewhat pedunculated, its circumference nearer the top was 14½ inches. It was tense, translucent to transmitted light, and with a strong light no solid portion could be made out. It was covered with true skin, but this was very thin over the apex, and was there adherent to the wall of the cyst below. Nearer the base the skin was thicker, and not attached to the cyst. The surface was congested, almost ulcerating, with a serous exudation. The tumor was not tender and gave no pain upon handling. Laughing and coughing did not increase its tension.

The child was brought from Kansas, where her home was on the prairie at distance from any medical advice, and, as the tumor was growing and beginning to show a tendency to ulcerate on the surface

the parents desired that something should be done which would remove the danger of rupture; and clearly understanding the danger of the operation, they wished that the removal of the sac should be attempted. This was accordingly done on December 5, 1887.

A special clamp was made to compress the pedicle of the tumor during the operation, and thus prevent the escape of cerebro-spinal fluid. It worked satisfactorily, and no fluid was lost during the operation. It was impossible to entirely remove the sac, a considerable portion of its wall being left close against the spine. The thinner portions of its wall were, however, entirely cut away down to where the skin was thick and of a normal character. The sac was multilocular; the fluid contained was clear and estimated at two pints. The edges of the sac were sewed with catgut, and the skin was brought together with silk.

The recovery from ether was satisfactory, with very little vomiting. The child took milk as soon as she was able to swallow, and suffered but little pain.

The second day there was some accumulation of fluid in that portion of the sac that was left, and a slight amount of leakage from the lower part of the wound. The temperature immediately after the operation reached 100.8° F., but the following morning it had fallen to 100° F., and the fourth day it came down to 99.4° F., being 98.6 F. that evening. Up to this time the child seemed to be doing well in every respect, except that the escape of fluid still continued.

On the morning of the fifth day the temperature was 98° F., the condition of the child seemed good, and she was taking nourishment well. Toward evening, however, she became quite restless, and did not care for her milk, and presently the hands and feet became cold. Toward midnight it was noticed that the muscles of the neck and back had become very rigid, and this condition continued without active convulsions. On the morning of the sixth day, with the gradual failure of strength, the pulse and temperature rose, the latter reaching 101.6° F. The child died that morning. No autopsy was allowed.

The examination of what was removed in this case showed the presence of considerable nerve trunks on the walls of the sac.

These two cases are the only ones in which I have operated for spina bifida, and the results are certainly not favorable to the operation. In the first, encouraged by the evidence that the communication with the spinal canal was small, the opera-

tion was done with a strong hope of success, and the result justified this expectation, as far at least as the survival of the child went. It is to be regretted that no careful histological examination of the tumor was made. Follin and Duplay found nerve elements present in five-sixths of all cases, and the paralysis of the child, which has become more manifest as it has grown up, makes it probable that the spinal cord or its nerves were more implicated in this tumor than was at first supposed.

In the second case we had a very different condition. The sac was large, threatened rupture, and freely communicated with the spinal canal. A rupture at a distance from medical aid would almost certainly cause speedy death. There was little doubt that the cauda equina entered the sac. The persistence of paralysis for four years did not encourage the hope of any considerable restoration of function. The case belonged to that class in which operation has most commonly failed.

At the same time the child was in good general condition. The nerves included in the sac did not preside over any vital function, and there was sufficient sound skin around the base of the tumor to cover the defect after all of the thinner portion of the cyst that threatened ulceration had been removed. It seemed possible, therefore, that if the operation was made perfectly aseptic it might be successful. Without an autopsy it is hard to satisfactorily explain the fatal issue.

In these cases especial care was taken to prevent the loss of cerebro-spinal fluid during the operation. Later experience of operations on the spinal cord seem to show that this is a needless precaution, as the fluid escaping during such an operation does not appear to affect the nervous centres injuriously. In answer to a question, Mr. Horsley writes me that he regards the loss of cerebro-spinal fluid during operation a matter of no importance whatever.

On the other hand, I think it important to close the wound after operation so closely that leakage of the spinal fluid shall not continue. For, first, it seems not improbable that a continuous and considerable loss of this fluid may seriously alter the internal pressure in the cord and brain; and, secondly, the

constant wetting of the dressings makes it extremely difficult to keep them thoroughly aseptic, and if the area about the wound once becomes infected, the extension of the inflammation inward may be very rapid.

In my second case there may have been extending inflammation of the cord, but in the absence of outward signs of inflammation about the wound, and with no characteristic signs of spinal irritation, it seems more probable that the constant drain of the cerebro-spinal fluid injuriously affected the internal pressure in the cord and brain. I should certainly in another case take even more pains to tightly close the wound against the possibility of leakage.

The plan of operation in both of these cases was rude, and was largely dominated by the fear of an imaginary danger from the immediate loss of cerebro-spinal fluid. With this fear laid aside, the operation planned by Bayer should be carried out, if the case permits.

He makes an opening in the side of the sac in order to avoid injury of the nerves. He then cuts off those nerves that end in the wall of the sac, and freeing those that run through the sac, replaces them within the spinal canal when possible. If the opening is small enough he closes it by ligature, for which he uses catgut. Fearing inflammatory extension through secondary fistulæ, he closes any point of leakage as soon as possible after it appears.

He has operated thus upon five cases, of which three were successful.

Case III. *Encephalocele; operation; recovery.*—Mary Ann H., a child of eight months, was brought to the Massachusetts General Hospital on June 11, 1891, and entered under the care of Dr. John Homans. On the first of July, at the change of service, I took charge of her. She had a tumor on the back of the head, which had existed since birth, being at that time small and having gradually grown until, at the time of entrance, it was about the size of a small orange, decidedly pedunculated. It was everywhere covered with normal skin, this being very thin over the upper part of it. The child had never had any symptoms of cerebral trouble, and there was only a very slight

tenderness over the tumor. Pressure could not diminish the size of the tumor, which was translucent and fluctuating, but did not pulsate. Examination under a high light did not show any especially solid portion in the pedicle. The opening in the skull was made out to be about large enough to admit the tip of the forefinger.

During the month of June this cystic tumor was injected three times with Morton's solution of iodine, each time being previously emptied through a trochar. The fluid that was drawn off was clear, slightly yellow, and albuminous. After each treatment the tumor rapidly refilled and quickly reached its former size. These injections were repeated three times in July, but all without the least effect in diminishing its size or bringing about any hardening. On August 5th, as no gain had been made by this treatment, it was decided to operate by incision.

The condition being evidently, in part at least, a hernia of the membranes of the brain, the skin was dissected off upon the sides, making flaps that would come together, and the tumor was amputated close down to the skull after the pedicle had been ligatured with catgut. There was very little leakage from the wound, and there was no difficulty in closing the flaps tightly over the stump. A dry dressing was applied, and the patient made a rapid and uninterrupted recovery, without ever developing any symptoms of nerve irritation.

Dr. W. F. Whitney made an examination of this tumor and found that it consisted outwardly of a sac covered by skin. "Beneath this was a fibrous layer, externally well vascularized, which recalled in its histological character the pia matter. Adherent to this were fragments of tissue, the peculiar folded character of which recalled the structure of the cerebellum, and this impression was strengthened by the similarity of cellular arrangement, although the large ganglion cells [Purkinje's] could not be found. In a few of the small pieces removed separately the cerebellar structure was even more marked. The growth was a cerebellar encephalocele."

In Sajous' *Annual* for 1889 Senn has collected four cases of similar operation for meningocele, with but one death. In the absence of a pathological report of these cases it is possible that in some of them portions of brain tissue may have been present in the walls of the cyst.

The instances of the removal of tumors shown to be en-

cephalocele are few—too few to enable us to decide the rate of mortality for the operation—but a sufficient proportion of them have been successful to show that in a good share of cases the survival of the patient may be looked for, provided the operation is conducted aseptically. *A fortiori*, the same is true of meningocele.

The failure of any good results from the injection of iodine in this last case is entirely in accord with what has been elsewhere observed in these tumors of the cerebral meninges.

The following extracts from a personal letter from Mr. Horsley in regard to the treatment of this class of cases will be of interest:

"In most cases of cephalic meningocele I believe that if taken early they could be cured by compression, as Lallemand's original case was in the last century."

Speaking of later cases, he says: "As regards cephalic meningocele, I think, where practicable, it should be excised. If, as in one case I had, it is situated at the nasal suture, with a view of avoiding sepsis, it can, as I have shown, be very readily treated by electrolysis. As regards cases in which encephalocele exists, I quite agree that the projecting portions of brain substance had better be excised, as in a very severe case which I published some years ago in *Brain*, in which I tried to cover over the projecting mass, the result was unsuccessful; and, considering the abnormality which such portions of the encephalon exhibit, I think they are not worth preserving."

IRREDUCIBLE SLIGHTLY STRANGULATED HERNIA OF THE LEFT FALLOPIAN TUBE; OPERATION; RECOVERY.

By JOHN HOMANS, M.D.,
BOSTON, MASS.

Fannie C., single, thirty-seven years old, tailoress. walked with a limp into the accident room of the Massachusetts General Hospital at six o'clock p. m., May 9. 1892. At the usual site of a crural hernia was seen an elongated, sausage-shaped swelling, perhaps four inches in length, dull on percussion, and evidently containing fluid. Gentle attempts at reduction were unsuccessful, and operation was decided upon.

The patient gave the following history of her trouble: Three years ago a small tumor appeared in the left groin, which gradually increased until it was about the size of the yolk of a hen's egg. The tumor was somewhat painful, especially before her menstrual periods. The tumor remained stationary for two years, and then disappeared for two weeks. It then appeared again and remained as before for nine months, when it again disappeared until the day of her entrance into the hospital. On this day, while eating her dinner, at one o'clock she felt a sharp pain at the site of the old hernia, and on examination she found the tumor had reappeared and was quite painful. She went home, and was unable to work, and rolled from one side of the bed to the other on account of pain; she could not lie still. At two o'clock she vomited. She was four and a half months pregnant.

Operation. An incision about three inches long was made over tumor in the inguinal region. The sac was blue-looking and evidently contained much fluid. When it was opened and emptied of about an ounce of fluid I was surprised to find within it a darkish-red mass, instead of the bowel I had expected to see. On pulling this up I found

it was the fimbriated extremity of the Fallopian tube, and about four inches of the tube. It was somewhat strangulated, but the circulation was not entirely arrested. The ring encircled the tube so tightly that it could not be drawn out nor pushed in, and I had to divide the fascia and then stretch the opening with my finger in order to get the tube back into the abdomen. The sac looked like an old one which had been sometimes inhabited and sometimes empty. Whatever may have been the former contents of the sac, it seems to me that pregnancy had raised the tube to the level of the opening and had allowed it to tumble in and become caught, and it was of such a small size and so yielding like a piece of string that it doubled in every direction when attempts were made to return it to the abdominal cavity. The pillars of the ring were sewed together with silk after the sac had been cut off, and the incision was closed around a small drainage-tube of bone. She vomited much from the ether, but this soon ceased, and recovery was uneventful.

Hernia of the Fallopian tube is not mentioned in the English works on surgery that I have consulted. The French surgeons speak of hernia of the tube and ovary, but not of the tube alone. I think hernia of the ovary and tube are more likely to take place through the inguinal canal; this was through the crural opening, and the tube was unaccompanied by the ovary.

I cannot help thinking that this sac was originally occupied by the omentum or intestine, and that the condition of the uterus, enlarged by pregnancy, placed the Fallopian tube opposite the opening into the sac, and that, having fallen in, it could not get out. Such a rare form of hernia is worth recording.

SARCOMA OF THE TONSIL.

By S. H. WEEKS, A.M., M.D.,
PORTLAND, MAINE.

Case I. — Mr. G. G. W., aged fifty-seven; clergyman; born in Casco, and living in Bar Harbor, Maine.

Family history. Father was a vigorous man; was killed by the falling of a bridge. Mother, of unusually good health, died at age of eighty-four years. Brothers and sisters all well and of good constitution. No cancer in his family.

Previous history. Never had any severe illness; has had for several years attacks of catarrh in winter, never severe, and easily contracted. Never used narcotics or stimulants. General health good. About October 18, 1890, he had a cold and slight sore-throat. While eating some grapes a seed lodged about the left tonsil, causing some pain and irritation, which increased. He called upon a physician in Boston to remove the seed, which relieved the swelling. The opinion of the doctor was that he would be well in a day or two. He left Boston for home, travelling by train, and took more cold, which increased the swelling, and about the 24th of October called the physician at home, who said the tonsil was ulcerated. The throat was inflamed, and the tonsil nearly filled the posterior part of the mouth and throat. The swelling diminished, and in a week was about the size of a walnut, and remained about the same size up to the time of its removal. About the 1st of January, 1891, a swelling appeared in the left side of the neck, about the size of a walnut; it increased in size to one-half or two-thirds of a hen's egg; was not painful. During the whole time the appetite was good; slept well, and general heath has not been better for years.

Physical examination. The left tonsil projects nearly to the uvula, fills the isthmus of the fauces, and distends the soft palate; it presents

a grayish, striated appearance, with an ulcer upon its anterior and inner aspect half an inch or more in diameter.

There are two masses in the left side of the neck, evidently diseased lymphatic glands of the deep chain, one lying in front and the other behind the sterno-mastoid muscle, apparently lying upon the deep vessels of the neck; they are about the size of a horse-chestnut; they are not painful or tender.

Operation. The operation was done on March 10, 1891. Ether was given. Patient in the recumbent position, head elevated on two pillows. One gland behind the sterno-mastoid was removed; a soft, gray infiltration was found, looking very like an encephaloid growth. A second gland, in front of the muscle, larger and deeper and of the same nature, was also removed.

The incision for removal of these glands extended from near the apex of the mastoid process obliquely across the neck, with the concavity looking forward and upward, to near the median line of the neck. Through this incision the diseased glands of the neck were removed. Portions of the parotid and submaxillary glands were exposed and held aside. The facial artery and external jugular vein were divided and secured by ligatures.

The next step in the operation consisted in exposing the lower jaw, just in front of the insertion of the masseter muscle, by an incision carried directly upward from the centre of the first incision. The jaw being exposed, it was divided with the chain saw, and the two halves were lifted apart. Now, by pushing the diseased tonsil outward with my finger in the mouth, it could be plainly felt in the external wound, covered by the mylo-hyoid and superior constrictor of the pharynx. Up to this time there was no opening into the mouth, and it was absolutely free from blood. The muscles covering the tonsil were now divided and the diseased gland removed with its capsule.

The incision into the mouth was about two inches long, through which the uvula, soft palate, and pharynx could be seen. There was but very little hemorrhage. The divided ends of the jaw were fastened with silver wire. The wound in the pharynx was not closed. A drainage-tube was inserted, and the external wound treated with the usual antiseptic dressings.

Résumé of subsequent history. Patient recovered from ether well. Temperature reached normal on the fifth day after operation; highest temperature, 100.5° F. Pulse ranged from 104 to 90.

March 12. Had almost no pain at all; throat, however, very sore. Moderate discharge of bloody serum.

14th. Throat very sore, and a good deal of pain on swallowing. Considerable discharge, with offensive odor.

15th. Takes considerable nourishment, such as milk, beef-tea, chicken-broth, and eggnog. Is using a mouth-wash of myrrh and water.

16th. Drainage-tube removed, and there is some passage of liquids which are taken into the mouth through the external wound.

17th. Sat up in a chair forty-five minutes. Wound is now dressed three times per day. Considerable discharge of pus, and the liquids from the mouth still pass through the external opening.

18th. Discharge from the wound less offensive and smaller in quantity. Myrrh mixture with which he gargles his throat comes out of the opening where the drainage-tube was, accompanied by pus.

19th. Suffers a great deal of pain in the mouth and throat, and complains of soreness of the tongue. Takes more nourishment and feels stronger.

20th. Wound all healed, except along the tract of the drainage-tube.

21st. Takes more nourishment than formerly, and the discharge from the wound is small and odorless.

22d. External wound is looking finely; the opening where the drainage-tube was, is growing less; still liquids pass through, slightly colored.

23d. Tongue quite sore, and there is a good deal of saliva discharged.

26th. The patient is steadily improving; eats and sleeps well; feels stronger every day.

29th. Almost no discharge from the wound. Soreness of throat is passing away, and there is not so much pain in the tongue.

April 4. Still improving, but complains of a lack of firmness in the jaw and inability to open the mouth to any great extent.

7th. Jaw feels firmer, and the discharge of saliva is growing less troublesome.

9th. Thirty days having passed, the silver wire was removed; the jaw seems to be firmly united, and the throat has a very healthy appearance.

10th. Was discharged relieved.

22d. I received a letter from him, in which he said his general health was improving every day. The swelling about the face and throat has

decreased about one-half. The inside of the throat looks well. Is able to walk out every pleasant day; has walked a mile or more. He says the jaw feels firm, but sore; is unable to chew hard substances. About the 20th of May his son, who is a member of the medical class in Brunswick, told me that two fragments of bone had been discharged, one from the external wound and one from the internal wound. They proved to be the fragments of the end of the jaw at the point of division with the chain saw at the time of operation. One of these showed the hole through which the silver wire passed.

I received a letter from Mr. W. one year from date of operation, March 10, 1892. The following is an abstract of his letter: General health very good. Called on his attending physician and had his throat examined. His physician said that the throat looked all right and healthy. Commencing with the 17th of January, he has occupied his pulpit once each Sabbath, speaking sometimes twenty minutes and sometimes even thirty. He also works in the Sabbath-school and in Sunday-evening and week-evening meetings. He says: "My throat seems all right; my jaw still aches; the cavities have not yet filled. The protective callus is being slowly absorbed. Near the end of my tongue there continues a soreness, growing less every month. Rubbing my throat on or near where the incision was made irritates the sore spot on my tongue, which causes me to believe that the soreness is caused by the severing of some nerves."

Case II. *Malignant disease of tonsil and side of tongue.*—Mr. E. P., aged seventy; birthplace and residence, Islesboro, Maine; admitted to the Maine General Hospital suffering with malignant disease involving the side of the tongue, anterior half of arch of the fauces, and right tonsil. It first made its appearance two months before his admission to the hospital. The mass on the tonsil was in a state of ulceration. The operation for removal was done on August 22, 1889.

Operation. The first step in the operation consisted in splitting the right cheek back as far as the masseter muscle, thus exposing the whole faucial region. The mass involving the side of the tongue was removed first, then the half arch, and finally the tonsil was removed by enucleating it from its capsule. I was struck with the facility with which this was done. After thorough removal of all the diseased tissues, the wound in the cheek was brought together by the interrupted suture and the ordinary antiseptic dressings applied.

Subsequent history. The day following the temperature and pulse were normal, and not much soreness.

August 27. Patient doing well. Wound granulating rapidly. Still some pain in swallowing.

29th. Improving. Wound nearly filled in. Using tincture of myrrh as a gargle.

September 2. Patient was discharged.

His family physician tells me that the patient lived about one year after the operation.

From my experience in the operation for removal of the tonsil, which is limited to these two cases, I am led to believe that the operation by splitting the cheek back to the masseter muscle, thus exposing the region of the fauces, and removing the diseased gland from the inside, is the one to be preferred. The operation from without is a more difficult one, and the division of the jaw is an objection to the operation.

RELAPSING APPENDICITIS, OPERATED ON DURING THE INTERVAL OF ATTACKS.

By S. H. WEEKS, A.M., M.D.,
PORTLAND, MAINE.

HISTORY OF ATTACKS.—*First attack.* Mr. Fred. T., aged twenty-three; residence and nativity, Brunswick, Maine; occupation, clerk. Patient had been troubled for some months previously with indigestion. On the morning of November 20, 1891, he awoke about 4.30 with severe pain in the stomach and bowels. He went to work at 5.30, and remained till 7. At 7 went to the druggist's and procured some medicine for the pain; at 7.30 took another dose of the same medicine. Went to breakfast about 8 A.M.; after breakfast went to work again and worked till 9. He then went to his physician's office, and the doctor gave him twenty drops of chlorodyne; took twenty drops more in about one hour; during this time he vomited twice. Gave up work and went home and took twenty drops more of chlorodyne. At 11 A.M. he sent for the doctor. The pain was so intense that it took three-eighths of a grain of morphine to give him relief. Stayed in bed for three days, and during the most of this time was under the influence of morphine. Confined to the house for seven days. The pain during this attack was not localized. Both iliac spaces were very sore and tender. Patient lost two weeks' work; he then went to work, and worked all of December.

Second attack. The second attack came on January 3, 1892. Came on at 3.30 P.M., with slight pain in stomach. Took twenty drops of chlorodyne. At 4 P.M. was nauseated, and vomited. At 5 P.M. sent for the doctor, who gave three-eighths of a grain of morphine hypodermatically. Pain very intense and heavy. On the fourth day had a consultation of physicians, to determine whether it was best to operate; it was decided in the negative. Stayed in bed ten days; under morphine most of the time.

Third attack. Patient was visiting a friend of his, who was a physician, living in Rowley, Mass. This attack occurred on February 24, 1892. Was taken about 11.30 with pain in the stomach. The physician with whom he was stopping gave him some medicine, the nature of which he did not know. Felt somewhat easier, and ate a very hearty dinner. Shortly after dinner a very severe paroxysm of pain came on, and the physician gave him another dose of the same medicine; but the pain steadily increased until 3 P.M., when he took three-eighths of a grain of morphine by the mouth. Left Rowley at 4 o'clock and drove to Ipswich, a distance of three miles, where he took the express for Portland at 4.25. After he got into the train he took another eighth of a grain by the mouth. Pain continued all the time; very severe; could not stand straight. At 6 P.M. took three-eighths of a grain more, and was nauseated three times up to 7 P.M. Drank hot water and applied hot towels over the abdomen. Procured a physician at Saco, Maine, and he injected three-eighths of a grain more. On arriving at Saco he telegraphed me to meet him at the train, and, as I was out of town, another physician treated him for me. I saw him the next morning and applied six leeches over the region of the cæcum, and then applied hot alcohol packs. The bowels were thoroughly evacuated by the use of the salines. On the fourth day I ordered a fly blister, four inches by six inches. After remaining in the city under my care for a week, he went home to Brunswick, a distance of about thirty miles. I saw him at Brunswick a few days later, and ordered another blister, three inches by four inches, to be applied; after that to paint with tincture of iodine. Patient was out of doors three times.

Fourth attack. Came on April 6, 1892. Had eaten a supper consisting of an egg dropped on toast, a molasses cookie, and a glass of milk. Thirty minutes after supper was taken with a very sharp pain in the stomach and bowels; took three spoonfuls of whiskey in a glass of hot water, which eased the pain somewhat, and at 7 P.M. sent for his family physician. The pain at this time was very intense, and he had a good deal of nausea. The doctor injected one-half a grain of morphine and at 9 P.M. gave three-eighths more. I saw him the next morning, and advised an operation after he had sufficiently recovered from this attack. I applied the hot alcohol packs and ordered morphine to be given according to indication. He was nauseated for three days, and retained very little nourishment. He came to Port-

land on April 25th, to the Maine General Hospital, and on April 26th I made the operation.

The Operation.—The operation was commenced at 10 A.M. Ether was used for anæsthetization. An incision about three and a half inches in length was made directly over the cæcum, and as soon as the abdominal cavity was opened sponges were packed in around the bowels to shut off the peritoneal cavity as much as possible.

Condition of the cæcum and appendix. The cæcum on the posterior surface was a good deal thickened by inflammatory action. The appendix was nearly encircled by its mesentery, and was attached by its mesentery to the posterior wall of the cæcum; its direction was upward and toward the right instead of toward the spleen. I separated the appendix from the cæcum, taking care not to wound the bowels, cutting the bands with the scissors instead of tearing them, and sutured the raw surfaces on the cæcum with fine catgut. I then applied a large catgut ligature for the purpose of temporary constriction, and cut off the appendix about half an inch above its base. I then sutured the divided mucous surfaces first and then brought up the serous surfaces over them and sutured these also. I then removed the catgut ligature. The wound was closed with interrupted sutures of silkworm-gut, and the usual antiseptic dressings applied.

Examination of appendix. On further examination of the appendix it was found to be nearly encircled by its mesentery. No foreign body was found in the appendix. On separating the mesentery or fold of thickened peritoneum from the surface of the appendix it was found that the ulcerative process had extended through the mucous and muscular layers, stopping at the serous surface, which in several spots was bulging, and it would have taken very little more inflammatory action to produce complete perforation. Several spots of clotted blood were noticed immediately below the serous surface. The end of the appendix was thickened and bulbous.

Subsequent History; Résumé.—*April 26.* Recovered well from ether at 12.30. Temperature at 5 P.M., 98.8°; pulse, 124. Had some nausea. Slept most of the night. Temperature during time of recovery, from 98.8° F. to 99.8° F.; pulse, 124–74. Salines were given on the third day, and followed by the saline enema with good results. Urine was passed voluntarily on the second day, but had to be catheterized twice subsequently. Complained of some distress in the stomach and back. The sutures were removed on the eighth day.

Patient has been very comfortable since the time of operation. During the whole period of recovery took only one-eighth and one-sixth of a grain of morphine. For the first twenty-four hours nothing but hot water was given; after that milk and lime-water for the first nourishment after the operation. The diet was gradually increased until he was able to eat solid food without distress. His recovery was uninterrupted, and he went home to Brunswick on May 22d.

A REPORT OF SOME INTERESTING CASES OF CEREBRAL TUMOR.

By FREDERIC S. DENNIS, M.D.,
NEW YORK CITY.

It has been my privilege during the past few years to have under observation and treatment twenty-one cases of cerebral tumor. Some of these cases have steadily advanced to a fatal issue. Several have been in children in which surgical interference was justifiable; but permission from the parents to operate could not be obtained. A few of the cases were cerebral hæmatoma, the result of traumatism. In this latter category the cases were operated upon at once. In one case in this list which cannot be strictly included in a discussion of brain tumors, although the pressure effects were similar, I removed a firm blood-clot of fibrin from the lateral ventricles of the brain by the use of the trephine. There was no fracture of the skull or any open wound, and the diagnosis was based upon the clinical history, and the operative interference was undertaken in view of the nervous manifestations. This was the first if not the only case in which a blood-clot has been removed from the ventricles of the brain. The object of this paper is not to report the histories of the cases of cerebral tumor that terminated fatally without surgical interference or to report the cases of cerebral hæmatomata cured by operation. These cases would furnish a most interesting collection.

At another time and upon another occasion the author hopes to bring these cases all within the scope of an article forming a contribution to cerebral surgery. The present paper will include the histories of six cases of cerebral tumor in which the efficacy

of certain drugs has been tested and the results recorded. In this category I shall report some cases as illustrating the influence of the iodide of potash or soda upon the absorption of the specific neoplasm, and also the result of the use of this drug in cases where no specific history could be obtained or found.

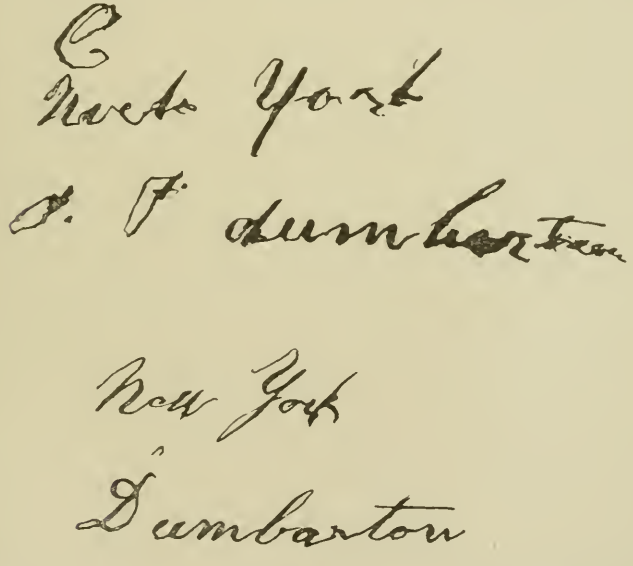
I trust that the report of these cases may call forth a discussion upon the question of the action of the iodides upon the absorption of neoplasms other than syphilitic.

In presenting these six cases collectively I shall give only a brief summary of their histories; but desire to state that in each case the history in full with a complete examination of all the nervous phenomena has been made. This general statement at the outset will avoid a repetition in narrating the individual histories. The test for the different varieties of aphasia and agraphia, and the examination of the eyes for choked disc, optic neuritis, and atrophy, the clinical history as regards diathesis, and the analysis of the urine, together with all other aids to diagnosis, have been carefully employed. Whenever, therefore, no special mention of some of these important aids to diagnosis is made in the brief history of the individual case, it is not to be inferred that these searching means have been omitted in the study of each case.

Case I.—D. W., aged thirty-seven years, consulted me in November, 1891, on account of some difficulty with his left eye, having been sent by Dr. McDonald, of Princeton, N. J. The patient stated that he suddenly felt some twitching in the muscles of his left eye. This spasm was followed by double vision of the affected eye. This condition naturally alarmed the patient, and he at once sought advice from Dr. McDonald, who found the pupil dilated, and prescribed iodide of potash and Fowler's solution, and insisted upon the importance of absolute ocular rest. The following day ptosis appeared, and within a week from the beginning of the attack the patient was sent to me. Upon examination I found ptosis of the left eye, dilatation of the pupil, external strabismus, protrusion and immobility of the eye-ball. I requested the patient to see Dr. Callan, the eye specialist, who failed to find choked disc or atrophy of the optic nerve, or any optic neuritis. In other words, the examination was negative.

Twelve years previous I had attended the mother of this young man. She had carcinoma of the breast, which I operated upon in 1880. Several years subsequently she died from metastasis of the disease in the thigh. I was at first apprehensive, considering this hereditary history, lest this neoplasm, which was producing pressure upon the third nerve, might be carcinoma. Giving the patient the benefit of the doubt as to the nature of the disease, I advised larger doses of iodide of potash until he took a large number of grains at a dose, three times daily. At first there seemed to be no improvement in his symptoms, but in a few weeks there was evidence of return of the functions of the muscles. In four months the patient was cured. In this case there was a history of syphilis which had been contracted fourteen years previous; and, although he was treated at the time for syphilis, and remained under treatment for one year, yet after this long interval the gumma developed in a most unmistakable manner.

Case II.—M. R., aged forty years, consulted me in January, 1892, on account of an inability to speak. I obtained from his wife the



following brief history: She says that her husband has been all his life a perfectly healthy man as far as she knew, and in February of this year, without any warning, he suddenly became unconscious, and upon his return to consciousness he found himself unable to speak. I

examined the patient and found him suffering from ataxic aphasia, agraphia, and the loss of power in his right hand. I began iodide of potash in the usual way and increased the dose until he was taking about three hundred grains daily. This medicine was continued for nearly four months. The patient is now perfectly well and has resumed business as usual. His speech is not slow, nor is it indistinct, and the full movement of the hand and forearm is restored.

I have with me his writing, which he executed just after his attack, and another specimen which he gave me two weeks after he began the iodide.

NOTE.—This patient has been well for several months, but within a few days he has had another attack less severe than the first. He is now upon the iodides, but enough time has not elapsed to arrive at any conclusion as to the result of the medicine.—*July* 25, 1892.

CASE III.—D. J. R., aged thirty-eight years, consulted me in August, 1889, on account of severe and persistent headache accompanied by an attack of vertigo. Patient states that during the attack he did not lose consciousness. He says that he "felt queer," had a peculiar feeling of faintness, and after lying down and taking some whiskey he found that he had double vision and that the angle of his mouth on the left side was devoid of feeling. He had also great difficulty in speaking. There was hesitation and indistinctness, and he called things by their wrong names. The diplopia, amnesic aphasia, and photophobia lasted for nearly a year, and there was also internal strabismus, and the head inclined to the right side. After the attack of vertigo and the appearance of the above-described symptoms, the severity of the headache was diminished, and it finally altogether disappeared. The patient states that ten years previous he had an attack of syphilis, for which he was not treated for over a year following the initial lesion.

I put the patient at once upon iodide of potash and increased the dose until he took six hundred grains daily. In several months he regained his speech and the function of the sixth and the seventh cranial nerves was restored, and, also, an abatement of the other nervous phenomena.

CASE IV.—J. K., aged forty-five years, consulted me in January, 1891, on account of attacks of loss of consciousness and of a difficulty of speech. Patient states that during the past three years he

has been seized with attacks of unconsciousness which lasted from fifteen to twenty minutes, and that after he had regained his senses everything for some time was a blank to him. The attacks were followed by ataxic aphasia. These attacks became quite frequent, and usually occurred while he was talking over some business matters of importance. He has experienced many of these attacks, at intervals, during the past three years. I gave him iodide of potash, beginning with ten grains, and gradually increasing the size of the dose until he took about three hundred grains daily. He positively denied any knowledge of syphilis, and I was unable to find any evidences of it by an examination. The potash was continued for several months, and the attacks grew less frequent until they have finally disappeared. Several months have now passed without an attack, and he appears perfectly well and has no hesitancy or indistinctness of speech.

Case V.—B. A. L., aged fifty years, was suddenly taken ill in New York City, in August, 1889, while transacting some business in Wall Street. He had been well up to that time. His sudden illness consisted in an attack of vertigo with loss of consciousness. After his return to consciousness his friends brought him to his country seat on the Jersey coast. I was asked to see him that same evening, and found him in a semi-dazed condition, exceedingly nervous and speaking with great difficulty. This condition gradually grew worse until about ten o'clock the same night, when he was seized with a well-marked convulsion which affected chiefly the right arm. He became unconscious for several hours, during which time his respirations were stertorous and his face cyanotic. After the attack had subsided the convulsions were followed by complete paralysis of the right forearm and arm. In other words, a monobrachial paralysis resulted. The aphasia, both ataxic and amnesic, continued, to which was added agraphia. The character of the attack left no doubt as to the situation of the lesion, and soon the facial nerve became involved.

The patient gave no history of syphilis, and this has been carefully inquired into subsequently. I gave him iodide of potash, beginning with about ten grains four times daily and gradually increasing the dose until he took six hundred grains daily. In less than six weeks the aphasia, the facial, and the monobrachial paralysis disappeared, so that within two months from the beginning of the attack he was driving his road horses as usual in the afternoons, and expressed himself as feeling perfectly well. From that time during the past

three years he has been actively engaged in business, and is at present in charge of one of the greatest financial enterprises of the day, requiring constant care and attention and the exercise of great executive ability.

Case VI.—Miss L., aged twenty-two years, a daughter of a prominent physician in this county, consulted me in August, 1890. At this time she complained of intense and persistent pain in her head. The pain had existed for some weeks, and it was located in the occipital region. No remedies seemed to relieve her pain, which was very acute in character. Following the headache a certain dimness of vision occurred. She stated that one day everything seemed blurred and indistinct. This condition remained a short time, and it was finally followed by ptosis of the right lid, dilatation of the pupil, and immobility and protrusion of the eyeball, with external strabismus. In the course of a few weeks the left eye became gradually affected in the same manner as the right. The ptosis, strabismus, dilatation of the pupils and protrusion of the eyeballs remained for a period of six months. The drooping of the eyelids was so intractable that the lids were kept open for weeks by an ingenious apparatus devised by the patient. The apparatus consisted of very narrow strips of adhesive plaster which were attached to the eyelids and then to pieces of elastic which were fastened to the hair on the back of the head. As soon as the eye symptoms just described appeared the pain in the head was less severe; although it did not entirely disappear. The urine was examined and found to be highly acid with sugar and some albumin. The eyes were examined with the ophthalmoscope with a negative result. The angle of the mouth soon became involved, and there was paralysis of the right facial nerve. Speech soon became affected, since the patient spoke with great indistinctness. In a short time ataxic aphasia was well pronounced and remained for a long while. In December the movement of the jaw became very much impaired and eventually mastication was impossible. If any attempt to speak was made the patient was obliged to hold the jaw up with her left hand. About this time there was impairment in the movement of the right upper extremity. The function of the wrist joint was destroyed, also the movement of the little and ring fingers of the same arm. Patient could move the elbow-joint, but she could not raise the entire arm from the body. This same condition soon extended to the left arm. The patient by December was unable to see owing to the ptosis, was pre-

vented from talking on account of the aphasia, was unable to masticate owing to the loss of movement in the lower jaw, and finally was incapable of moving her arms due to the paralysis affecting the upper extremities. Her general condition seemed very grave, and much anxiety was naturally felt lest she should not recover. There was evidently a growth causing pressure upon the roots of the several cranial nerves. This growth was producing some irritation on the floor of the fourth ventricle, as was manifest by the appearance of glycosuria The growth was increasing in size, as was evident by its attacking the different cranial nerves in rapid succession. Early in October I began the administration of iodide of soda with arsenic in the form of Fowler's solution. I have been in the habit of using arsenic with the iodide, especially in the case of women, since the arsenic seems to control the potash acne which is often so disagreeable to the patient. The alkali was begun in ten-grain doses with four drops of the Fowler's solution. The dose of the potash was gradually increased from ten grains until the patient took about two hundred grains daily for several weeks, in conjunction with the arsenic, and later on with strychnine without the arsenic.

Several weeks transpired before any improvement could be observed. After the patient began taking the potash in large doses in a little while a gradual improvement was manifest. The nervous phenomena began to subside, and a slow but steady progress toward recovery followed. Electricity and massage were now added to the remedial agencies. In January the prognosis began to appear more favorable.

After two months administration of large doses of potash in conjunction with the battery and massage the patient was practically cured. In about one year from the onset of the symptoms the young lady, who was a great equestrienne, was riding after her usual custom. She is at present perfectly well, with not a trace of any nervous symptoms. In fact, there is not the slightest impairment in any of the functions of the cranial nerves, or any loss of power in the muscles of her upper extremities. I have seen the patient within a month, and her general health is perfect. This, in brief, is the clinical history.

The diagnosis of brain neoplasm seems to admit of no doubt. The nature of this growth, however, is not so clear. The patient has no history of any specific infection either acquired or hereditary. The circumstances of the case preclude the possibility of an acquired specific character of the neoplasm, and inherited syphilis is not so likely

to cause cerebral gumma. The presence of a tumor was evident; the use of the iodides pushed to its utmost limit and persevered in for many weeks caused the neoplasm to completely, though slowly, disappear. The question naturally arises, Will the iodides cause neoplasms which are non-specific in character to disappear? This case strongly favors this opinion, and in view of other cases in which the same nervous symptoms have been present, and complete recovery followed after the use of the iodides, it would seem that this drug has certain influences over other growths than those of a specific origin. In this case the iodide of soda was employed instead of the usual form of potash. It has been my experience that patients will tolerate large doses of iodide of soda when small doses of the iodide of potash will cause nausea, gastritis, and the other symptoms due to the use of iodide of potash.

These six cases illustrate some interesting and tangible facts in regard to the diagnosis as well as to the treatment of cerebral neoplasms. In the first three of the cases reported without doubt an unmistakable history of acquired or hereditary syphilis was present.

In the second three cases no specific history, either acquired or hereditary, could be obtained. Of the cranial nerves involved in these last three cases, two are not those generally affected by syphilis, and the cortical cerebral substance was the seat of the lesion. The only reason for supposing that these cases of cerebral neoplasm were specific in character is that they all three, like others similar to them, disappeared during a regular course of the iodide of potash and soda. These facts bring us naturally to the question whether the iodide of potash has any influence over the non-specific growths such as tuberculous gummata. I am fully aware that keratitis has been observed after thirty-two years of supposed inherited syphilis; still this fact is no more astonishing than the action of the iodide of potash upon the absorption of a typical gumma. If this drug will cause these cells to become absorbed or to disappear, is it unreasonable to suppose that certain inflammatory growths or exudations or thickenings depending upon the collection of similar cells should be similarly affected by the same drug? I

am frank to confess that I have seen cerebral growths in which I could trace no specific origin disappear after a fair trial with the iodides.

Either this drug has a veritable action on other neoplasms aside from syphilitic or else the symptoms in these cases of brain tumor fail to reveal the specific origin of the growth. If these symptoms are due to the specific virus, and this point cannot be diagnosticated, then there is much for the surgeon and the neurologist to learn in order to arrive at a differential diagnosis between a true syphilitic gumma of the brain on the one hand, and a tuberculous gumma or hysteria or inflammatory exudation or pachy-meningitis on the other hand. Either there is a mistake in the diagnosis or else the iodide of potash has influence upon other growths than syphilitic. If this latter postulate is true, it follows that the iodides have a decided action upon other cells, such, for example, as connective-tissue cells, which might form a sarcoma.

This question is one to which great interest is attached, and also one upon which great diversity of opinion exists. It is a question, moreover, of great importance, since miraculous recoveries in cerebral neoplasms have followed the use of the iodides in which the diagnosis of brain neoplasm was believed to admit of no doubt, and in which no specific history could be obtained, and yet these cases ultimately recovered after the administration of the iodides.

Professional opinion, as a rule, holds that the iodides have no action upon any cerebral growths except of a specific nature, yet cases occur from time to time that would seem to overthrow this view. It is only by collective evidence, by individual investigation, by scientific contribution, and by discussion, that all the facts bearing upon this great question can be brought out and sifted and studied in order to establish the certainty or the uncertainty of this question. I am frank to admit that more evidence is wanting before an answer in the affirmative can be given; but these cases offer simply a suggestion. I trust that a discussion among the members of this Association will throw some new light upon a question which offers so much of interest to the profession as well as to the laity.

ENTERECTOMY FOR SARCOMA OF THE MESENTERY.

By JAMES McCANN, M.D.,
PITTSBURG.

The history of the following case may prove interesting as a contribution to the surgery of the abdomen:

T. W., male, aged forty, laborer, German, was admitted to surgical wards of the Western Pennsylvania Hospital on November 30, 1891, for treatment of a growth in the abdomen. He stated that sometime during the latter part of July last he discovered a tumor in the abdomen which at times was freely movable, and although comparatively painless, was steadily increasing in size and was beginning to cause some colicky pain when it became markedly displaced upward into the left hypochondrium, and which also seemed to be causing some constipation. When admitted the man's health seemed to be fairly good, and his appetite and digestion were good; his skin was clear, his tongue clean, and body tolerably well nourished; the pulse, temperature, and respiration were normal, and the urine was normal in quantity and free from traces of sugar or albumin. He had suffered from an attack of pneumonia, and had had acute articular rheumatism several years ago, but beyond these attacks his health has always been good. His family history is imperfect. He asserts that no cases of cancer or other tumors have ever occurred in the family, and with the exception of the colicky pain, has suffered nothing from the tumor with the exception of the annoyance of the presence of the growth. But he admitted that his mother and an aunt died of dropsy.

Physical examination of the abdomen revealed the presence of a large tumor about the size of a cocoanut, apparently ovoid or pyriform in shape, smooth and regular in outline, and occupying the central part of the pelvis, though inclining toward the right side. This tumor was freely movable, and by careful manipulation could readily be displaced from its position in the pelvis, and could then be carried upward into the right hypochondrium; thence across the abdomen above the umbilicus to the left hypochondrium. From this position it gradually gravitated back to its favorite location in the pelvis. These movements were not attended by any pain or distress, and only when the tumor was pushed high up underneath the ribs on the left side did it cause any uneasiness. The question of diagnosis could not be satisfactorily determined and the probabilities of a floating kidney, a wandering spleen, or a tumor of the omentum seemed equal; though the absence of any renal complication on the one hand, and the existence of a normal area of splenic dulness on the other, rendered the first two suppositions improbable.

On December 1, 1891, after freely evacuating the bowels by a saline purge, followed by a copious enema, and after thorough cleansing of the skin of the abdomen and rendering it reliably aseptic, the abdomen was opened by an incision in the median line and the tumor exposed.

It was ovoid in shape, its surface very smooth and shining, and of a dull-red or purplish color; it was freely movable, and was readily lifted from its position in the pelvis and brought fairly into view; but owing to its size it could not be gotten out of the abdominal cavity until after the enlargement of the abdominal incision to the extent of six inches. When lifted out of the abdomen it was found to spring from the mesentery of the small intestine, with which it was firmly incorporated, and that in addition, a loop of the ileum several inches in length was very densely adherent to its anterior surface. An effort was made to detach this loop of intestine by carefully dissecting it away from the surface of the tumor, but this was found to be impracticable, as the wall of the intestine was so intimately

blended with the stroma of the tumor that in the effort to find a line of separation the intestinal wall gave way and a rather extensive opening into the bowel resulted. The intestine was immediately clamped on either side of this opening by a pair of spring clamps protected by rubber tubing, so as to prevent fecal extravasation. Large flat sponges were firmly packed into the abdominal wound, and the tumor was then rapidly dissected from its attachment to the mesentery, and the hemorrhage from the severed mesenteric vessels controlled by clamp forceps. It was now evident that the tumor was malignant in character and probably sarcomatous; and, as the mesentery and bowel both showed evidence of infiltration with the adventitious growth, a portion of the intestine eight inches in length was excised, together with a triangular portion of the mesentery; this section being carried far and wide of any suspicious-looking tissue, in the hope that by a thorough removal of all doubtful tissue a more perfect safeguard against the return of the disease would be established.

The bleeding, which was rather profuse from the severed vessels, was controlled by fine aseptic silk ligatures. As preliminary to the effort to unite the severed end of the intestine, the wound in the mesentery, resulting from the removal of the diseased portion, was united by a double row of continued Lembert sutures, special care being taken to secure very accurate and deep coaptation at the border of attachment to the intestine. This was, fortunately, effected so perfectly as to bring the several ends of the intestine into very perfect approximation.

It now remained to unite the ends of the intestine, and this was accomplished by means of a double row of very strong and very fine silk sutures, the needle used being an ordinary milliner's needle. The first row or line of sutures was introduced from the mucous surface of the intestine, and started directly at the mesenteric border. This suture was passed from the mucous surface of the intestine and carried through the areolar and a portion of the muscular coats, emerging on the raw surface of the incision, but not penetrating to the serous surface. The

needle was then made to enter the raw surface on the opposite end of the bowel, and was pushed through the muscular and areolar coats of the bowel and emerging on the mucous surface at a point directly opposite the point of entrance of the first portion of the suture. When this suture was tied the raw surfaces of the bowel were brought into perfect apposition, the knot being within the lumen of the bowel. A row or line of continuous sutures was now closely introduced, in a similar manner, until the entire raw surfaces of the ends of the bowel were closely united and the lumen of the bowel restored perfectly, so far as its mucous surface was concerned. It yet remained to bring the serous surfaces into apposition. This was affected by means of a Lembert suture introduced in a continuous manner, the sutures being introduced at intervals of one-eighth of an inch, and especial care being observed in bringing the peritoneal surfaces accurately together at the line of mesenteric attachment. A smooth and exceedingly perfect line of union was thus established between the divided ends of the bowel, and the possibility of intestinal leakage was reduced to a minimum.

The spring clamps were now detached, the surface of the bowel gently douched with warm, diluted Thiersch's solution, but no flushing of the abdomen was attempted. The bowel was now gently replaced in the abdominal cavity, a short rubber drainage-tube introduced, the abdominal wound closed by ten silver wire sutures, the usual antiseptic dressing applied, and the patient placed in bed in the ward.

The tumor weighed a little less than two pounds, was very firm and solid in structure, and, on microscopic examination, proved to be a spindle-celled sarcoma.

Although the operation lasted over an hour almost no shock followed its completion, and the recovery was uninterrupted and uneventful.

The after-treatment was practically nothing so far as medication, but rigid attention was paid to diet. For the first forty-eight hours after the operation he received nothing but an occasional spoonful of hot water; then he was permitted to

take very small quantities of lime-water and milk or weak chicken broth, and he also received rectal injections of beef essence at intervals of six hours. At the end of a week he began to take small quantities of corn-starch or milk and rice. This, with the addition of milk-toast, constituted his diet for the ensuing fortnight.

His pulse rose to 98 on the night after the operation, and his temperature reached 101° at the end of twenty-four hours. The pulse dropped to 74 on the third day and the temperature to 100°. Both remained at nearly the normal until the sixth day, when the temperature again reached 101.3°, but fell again on the following day to 99°. The bowels moved naturally and without pain on the sixth day, and continued to move daily during his residence in the hospital. He left the institution voluntarily on the twenty-first day after the operation, and by a letter from his physician I am informed that he still continues to enjoy excellent health and is able to work at his former occupation.

Remarks.—The operation of enterectomy is a very old one. Ill, in the *N. Y. Medical Journal*, says that in 1727 Ramdohr performed this operation, removing several feet of the small intestine, uniting the ends by circular enterorraphy. It has been considered a most hazardous proceeding, and not until revived by Langenbeck and Küster, in 1875, was the profession willing to recognize it as a justifiable operation. Since that time new methods have been tried, and better results following the opening of the abdomen have stimulated surgeons to attempt resection for malignant growths, stricture, and gangrene of the bowel. Koeberlé, in 1881, did not hesitate to remove 204 cm. (6¼ feet); Kocher, 160 cm.; Braun, 137 cm. In all these cases recovery followed. Resection of gangrenous bowel has furnished the most cases. These operations are found in the tables of McArdle, *Dublin Journal of Medical Sciences*, 1888, and McCosh, *New York Medical Journal*, 1889.

The cases of resection, after rupture of the bowel, without external wound, in which enterorraphy was performed, have

been collected by Croft, of St. Thomas's Hospital, of London. Fourteen cases are reported.

Since the publication of Dr. Senn's well-known papers on intestinal surgery a number of cases have been reported recently with a fair proportion of recoveries.

In 1886, Nicolaysen (*Centralbl. f. die ges. Med.*) resected seven inches of the intestine for sarcoma, involving the mesentery and part of the bowel. The tumor was readily movable over the abdomen, and descended during the day to the superior strait of the pelvis. It caused some distress, and was removed because it seemed to grow larger. A triangular piece of mesentery was excised with seven inches of bowel. Circular enterorraphy was performed, and the case recovered.

In 1888, Sinclair (*British Medical Journal*) resected four and one-half inches of bowel, recovery following.

In 1889, Croft (*Lancet*) reported a case in which he resected two and one-fourth inches, and the case recovered.

In 1889, Rubio, in *Deutsche med. Zeitung*, Berlin, reported a case of recovery after three inches had been removed and circular enterorraphy performed. He reported a second case from the *American Practitioner and News*, of Louisville, Ky., in which a woman had a resection of malignant disease of the bowel in 1886, and a second in 1889, in which three inches were removed, and she recovered.

In 1890, Dr. Studgaard (*Nordiskt Mediciniskt*, Stockholm) reported a successful case, from which two inches were resected for stricture.

Dr. Agnew, in his *System of Surgery*, Philadelphia, 1889, reports two cases of resection of ten inches by Dr. Sutton, of Pittsburg; one case recovered, the other died.

In 1891, Mr. J. Bland Sutton (*British Medical Journal*) resected a portion of the ileum with the vitello-intestinal duct; the case recovered.

In 1891, May 14 (*British Medical Journal*), Dr. Berkley Martin resected twelve inches of strangulated bowel, and the patient died.

In 1892, May 8 (*British Medical Journal*), Mr. Arbuthnot Lane resected three inches of gangrenous bowel, covered the united ends with an omental graft; the case recovered. In his second case, in which four inches were removed and the omental graft applied, the patient died on the fifth day from shock attending the disease and operation.

In 1891, January (*British Medical Journal*), Mr. Lockwood performed the operation on a child of four years for intussusception, uniting the ends by Czerny-Lembert suture; the child died of shock.

In 1890, Dr. Frank, in the *Präger med. Wochenschrift*, reported a patient, aged twenty-six, with consolidation of the apex of one lung, who had aborted two years before, on whom he performed abdominal section to remove the tubes and ovaries for double salpingitis. She suffered pain in the hypogastrium, nausea, and diarrhœa. Tuberculous projection from the ileum seven inches above the ileo-cæcal valve and extending upward was found. He resected twenty-nine inches and performed circular enterorraphy and united the ends by means of the Czerny-Lembert suture. His patient recovered; and he states that it is the fifth case on record of resection for tuberculous intestine.

VERY LARGE LYMPH-CYST (CHYLE-CYST?) OF THE RIGHT SIDE OF THE NECK.

By CHARLES B. NANCREDE, M.D.,
ANN ARBOR, MICH.

Although my search through the literature of this subject has been of necessity a brief one, yet it has covered enough ground to warrant the assertion that the case whose history I shall read to you is one of great rarity.

Quain[1] has described among the anomalies of the lymphatic system certain specimens which may give some clues as to the probable condition present in my patient. Thus, in a body without any transposition of the viscera, the thoracic duct was found emptying into the veins of the right side, no trace of a left lymphatic duct being detectable; moreover, the same authority states that the thoracic duct not uncommonly divides into several branches separately emptying into the great cervical veins, occasionally one of these divisions passing across to enter one of the veins of the right side of the neck. According to W. Krause, "in very rare cases the duct is double throughout, the two canals opening into the veins" of the neck. Several cases are on record where no transposition of the viscera existed, yet in which the thoracic duct opened into the right cervical veins with a right aortic arch (Allen Thompson), with a root origin of the right subclavian artery (Fleishman, Todd, J. W. Brown), or with a normal arrangement of the great arteries (Morrison Watson).

It may be as well here to mention a few recorded cases of tumors, which, in some respects, resemble although they are not identical with the disease affecting my own patient.

[1] Quain's Anatomy, 9th ed., p. 529.

A. E. Barker reports a case where death following amputation for what had been diagnosed as a nævoid lipoma of the thigh, a retroperitoneal, thin-walled cyst was found lying in contact with the bladder on the right side of the brim of the true pelvis, another much larger loculated one was situated just below the lower end of the right kidney, while a third was detected occupying the scrotal tissues; these cysts contained a clear fluid supposed to be lymph, and was lined with endothelial cells, but all efforts to inject them through the lymphatic system failed, very possibly owing to the amputation wound through which the injecting fluid freely oozed.

Billroth[1] reports a cavernous lymphatic tumor of the groin which he mistook for a cold abscess, and incising it a lymph-fistula resulted which was only cured by excision of the tumor mass. The same surgeon successfully removed by dissection a similar growth from the dorsum of the foot of a child one and a half years old. All these tumors were multilocular or growths manifestly composed of masses of dilated lymph-vessels; moreover, their contents were pure lymph containing nothing resembling chyle.

It is true that Clutton,[2] Durham,[3] and others have reported oil-cysts removed from over the sternum or from the neck, but microscopic examination of their walls readily demonstrated their dermoid nature.

Let me now briefly sketch the history of my own case, appending the pathological report of the fluid, kindly given me by Dr. Gibbes. But little comment will then be needed to show the marked difference it presents from either the ordinary cavernous lymphangeiomata or the oil-cysts of dermoid origin.

J. S., aged fifty-seven years, an otherwise healthy man, who had never received any injury to the neck, noticed somewhat over a year ago a rounded, tense, painless swelling just above the right clavicle, which steadily grew until, when he presented himself at my clinic at Ann Arbor, the whole right inferior carotid triangle was filled by a

[1] Billroth's Clinical Surgery, Sydenham Society ed., p. 449.
[2] Transactions Pathological Society of London, vol. xxxvii., p. 393.
[3] Ibid. vol. xxxviii., p. 302.

tense, globular, pulsating mass, extending from the clavicle upwards to a level with the angle of the jaw, from the middle of the sternal notch outwards to the margin of the trapezius, being bounded internally by the trachea below, and at its upper portion apparently by the anterior edge of the sterno-cleido mastoid muscle, which passed over the swelling. I need hardly say that the tumor projected far beyond the level of the clavicle. The skin with its superficial veins was unaltered in appearance, there was no tenderness on handling, and a sensation of uneasiness from pressure on the trachea, with the unsightly appearance of the tumor, alone induced the man to consult me.

From its position and appearance I at once suspected the condition to be a so-called hydrocele of the neck, and therefore probably in some way connected with the lymphatic system. Strong concentrated light showed no distinct translucency, though it gave the impression that a somewhat more intense illumination would develop this sign. A puncture with an exploring needle gave vent to such a peculiar chyle-like fluid that I determined to aspirate as a preliminary measure to incision and drainage. I thus obtained a fluid which was almost certainly chyle, for it was yellowish, somewhat opaque, but clearly not pus of any description. During the middle stages of the flow, quite as much as the later, the fluid in the receiver was of a uniform, very slightly rosy hue, on the surface chiefly, as the fluid when flowing looked simply yellowish. After obtaining eighteen ounces of the fluid the region formerly occupied by the tumor looked absolutely normal, no apparent trace even of a cyst-wall being discernible. The fluid upon exposure to the air appeared to become somewhat more roseate, although the tint was very faint and the change of color was not beyond question. A relatively large clot promptly formed. The cyst rapidly refilled, despite pressure, so that twelve days later half a pint of a fluid identical with the first was withdrawn. The patient declining radical treatment, upon a third aspiration, less than three days after, two ounces more of the fluid was obtained, leaving the cyst partly filled, owing to the canula becoming blocked.

I here append Dr. Gibbes' report.

Report on Fluid received from Dr. Nancrede.

On examination this fluid was found to consist of two parts, a thick, light yellow liquid portion and a loosely formed clot. The liquid part

under the microscope was found to be made up of amorphous granules, some blood cells, and a watery fluid. The addition of dilute HCl caused the formation of an amorphous material which appeared to be some proteid substance coagulated by the action of the acid.

On placing some of the fluid in a centrifugal machine a white crust was separated which consisted of amorphous granules; these could not be recognized as fat under the microscope, but the addition of a strong alcoholic solution of KOH, and exposure to a temperature of 40° C. at once caused them to change into innumerable oil globules (olein).

The clot, under the microscope showed fibrin, and in some parts a large number of red blood-corpuscles, many of them crenated. This part of the clot was slightly colored by them. A few small amorphous masses were found which appeared to consist of some fatty substance, but they were too few to enable their composition to be determined. A portion of the clot was gradually hardened in alcohol and sections made of it. On staining these nothing further was made out, as they consisted almost entirely of fibrin with white blood-cells in the meshes. A few acicular crystals were found, but their nature could not be made out; there were only two or three in a section.

HENEAGE GIBBES, M.D.,
Professor of Pathology in the University of Michigan.

From this it will be seen that in every respect the fluid corresponded closely to chyle, and, while I lack the demonstration afforded by a microscopical examination of the structure of the cyst-wall, I can have no doubt in my own mind that the tumor was caused by dilatation of one of the aberrant branches of the thoracic duct, which I have already shown, at times, empty into the cervical veins. The possibility of the main duct itself being involved is, I think, excluded by the comparatively slow rate of filling up of the cyst. The minute trace of blood in the fluid is probably to be accounted for by the direct communication shown, by Wagner, I believe, to sometimes exist between pathological enlargement of the lymphatics and the small venous radicles.

In conclusion I would express my indebtedness to Dr. Gibbes for his assistance in my hurried consultation of the literature of lymphangeioma.

TUMOR OF CÆCUM CAUSING INTUSSUSCEPTION; OPERATION ON THIRD DAY; REDUCTION OF INVAGINATION, ENTEROTOMY, AND REMOVAL OF TUMOR; DEATH.

By MAURICE H. RICHARDSON, M.D.,
BOSTON.

On Tuesday, January 12, 1892, at 7 P. M., at South Hanover, Mass., I examined Mr. C. T. P. at the request of his physician, Dr. A. L. McMillan, of Hanover. I give in detail from my stenographic notes the history of this most unusual case.

History, by Dr. MacMillan: "C. T. P., aged fifty-two, manufacturer, was taken down with the grippe about a week ago. Sunday night he had taken a pill containing rhubarb, which produced a movement Monday morning, about which nothing unnatural was observed.

"Yesterday morning, at 8 o'clock, I found Mr. P. suffering with pain in the bottom of the stomach, coming in paroxysms, which cramped him all up in bed. Gave him half a grain of morphia, and in an hour another half-grain; later, another half-grain. That stopped the pain, and he felt quite easy. I went away at 11.30.

"He had a good movement of the bowels at 6 o'clock. There was no blood in that—it was perfectly natural. In about an hour the pain came on. It was the same pain, like the first. During the night he was uneasy, and at 11 o'clock was more uneasy and in greater pain. Took three quarter-grain morphia pills, the last at 1.20 A. M., to-day. Then he began to feel sick at the stomach, and vomited twice the water he had drunk. He drank considerable hot water during the night. The vomiting made him feel a little better. At 3 A. M., Tuesday, had a bloody stool, which was followed by three or four others before my arrival, at 9 A. M.

"During this night he was doubled up, and stayed a good deal of the time on his face. Yesterday I thought it was a case of colic.

Years ago he had a severe attack of bilious colic. That was forty years ago. His general health is not very good. He has a cough, and has been in feeble health generally. Has a slight rupture in left groin. No pain in that. Had at one time a fistula.

"To-day, Tuesday, he has been pretty comfortable, as he is now. Has begun to hiccough a little. This has been relieved by champagne. There have been several bloody stools during the day, of the same size and character as the first. He has passed gas in small quantities to-day. Temperature has been normal; pulse slow."

I found Mr. P. lying on his side and face, with knees drawn up. He stated that he had worked pretty hard up to the last six months. "Two years ago I had an acute laryngitis, and felt quite sick. Thought it was a sort of grippe. Since then I have been gradually and slowly building up from that. A week ago last Saturday I was feeling pretty well. I have never considered myself in rugged health. My bowels have been regular after breakfast every day. Stools have been formed and natural. At one time I thought I had a fistula. It got well in five or six months. There was no discharge from the rectum, and I have never, to my knowledge, passed any blood. Have never had any piles nor any discomfort after a movement of the bowels since I was a child. I had bilious colic at fourteen, and there was supposed to be a tumor up the rectum a little way. At that time I was taken with severe pain in the night. I do not remember just where the pain was. It was all I could possibly bear. The doctor gave me morphine. Then, after that, every day I would have a chill when the pain came on. During that summer the bowel came down one day, and they had to put it back. There was a tumor on the bowel which was about the size of the little finger. It was on the left side, and could be felt a little. There was no subsequent trouble. It was where I have a little rupture now. The doctor thought it was absorbed.

"Yesterday morning the pain was in the left side (indicating the left lower quadrant of the abdomen). There has been no loss of flesh. At the present moment I feel well enough to get up and go about my business."

General appearance good. Pulse 60, full and strong; temperature, 97.2; abdomen soft. He resisted deep pressure, which seemed painful at first. Later, abdominal walls relaxed, and pressure seemed painless. In the left flank there was a resistance, suggesting distended coil of intestine. This was deeply placed, and could be made out with

difficulty. It seemed to be smooth, tense, and tympanitic, calling to mind those cases where I have found a coil distended by strangulation or acute obstruction. This coil extended upward and was lost in the region of the left kidney. By rectum nothing abnormal could be felt.

Tongue clean. Occasional hiccough present. Loud gurgling heard almost constantly. Urine passed easily—normal in amount and character. Feet and hands warm.

The discharges, eight in number, measured about half a pint each. They were colorless and thin; in color deeply stained with liquid blood.

The condition seemed to me probably due to an acute obstruction, either from twist, intussusception, or malignant stricture. In view of the fact that he was feeling "well enough to get up," and that I was entirely unprepared for operation, I decided to delay till the following day.

On my return, late that night, I made preparations for laparotomy at a moment's notice.

On the following day Dr. MacMillan reported that, after a very comfortable night and morning, his hiccough had returned, and that, while he did not feel distinctly worse, there was no improvement in the essential features of the case.

I arrived at South Hanover, with Dr. Fitz, at half-past 3 on Wednesday. The patient's general condition was the same as on Tuesday —good. The tumor in the left flank was found with great difficulty and uncertainty, owing to increased distention. Dr. Fitz advised immediate laparotomy on the ground that the man's chances of recovery would be increased by early exploration of the abdomen, in view of the great doubt as to the nature of the existing conditions, which seemed to him to be either an invagination or a twist.

An incision was made in the median line large enough to admit the hand. I found a kidney-shaped swelling just above the brim of the pelvis on the left side, which extended along the course of the ascending colon around the splenic flexure, and could be traced as far as the stomach. On the right side I could feel this hard, oval mass, beginning at the median line. On enlarging the incision and pulling out the intestines I found a firm band extending from about opposite the body of the fourth lumbar vertebra up toward the left. This I thought might be the constricting band of a hernia through the mesentery. On exposing the part I found the small intestine had become in-

vaginated into the large. Gentle efforts at withdrawing the small intestine were unsuccessful. I then placed the left hand in the abdominal cavity and pressed upon the invaginated portion, at the same time withdrawing gently on the small intestine. This manœuvre was unsuccessful. The manipulations were very careful, in order to avoid tearing the intestine, yet the mesentery was lacerated in one place, requiring the application of pressure forceps. The incision was again enlarged, and the whole intestine, with its contents, delivered from the wound. At least thirty minutes were taken in trying to push back the invaginated portion, without success. Suddenly, when I was about to give it up, the mass down by the sigmoid flexure started, and was delivered and everted with the greatest ease. On the delivery of the caput cæci, which was recognized by the position of the vermiform appendix, that portion of the intestine was found enormously distended, thickened, and resistant. The firmness of this mass seemed to indicate something more than œdema from constriction. I finally came to the conclusion that there was a tumor inside, and, on making a longitudinal incision about three inches in length through the gut, opposite the mesenteric insertion, I discovered, attached to the mucous membrane of the interior, an oblong tumor about the size of a large Bartlett pear. This was attached by a broad pedicle to that point of the cæcum which points toward the groin. It was situated about an inch from the opening of the small intestine. This was rapidly dissected off with the scissors. The patient, up to this time, had borne the operation remarkably well. His pulse was very good indeed, though somewhat increased in frequency and diminished in force. There was some hæmorrhage from the pedicle of the tumor. The wound in the mucous membrane, which bled freely, was closed by a continuous silk suture. The incision in the cæcum was closed by interrupted Lembert sutures, and reinforced here and there by continuous strands of silk. The bowels were then returned to the abdominal cavity, and aseptic gauze was placed against the line of intestinal suture to provide for possible giving way. The patient was placed in bed with heaters, and with feet elevated, and a stimulating rectal enema was immediately given, which he retained.

In this case the greatest difficulty was found in reducing the invagination. It was finally accomplished by persistent pressure with the right hand upon the extremity of the invaginated portion.

For two hours after the operation the patient's condition was alarming. The respirations were shallow and the pulse was feeble. He

rallied at the end of that time, and had a fairly comfortable night. The hiccoughing ceased, and there was but one attempt at vomiting. On the following day (Thursday, January 14th), his temperature was 102 in the morning, and his pulse 110. Had a very comfortable day. Retained his enemata and had, occasionally, champagne by the mouth.

At 5 o'clock I saw him. I found his pulse 130, of not very good quality. His knees were drawn up, and there was cold perspiration on his face. While I felt encouraged by the fact that he was alive, and felt hopeful that he would get well, yet the general appearances were not good. Continued the stimulants and rectal feeding, with morphia.

At 4 o'clock on the morning of the 15th of January he died, pulse and temperature having rapidly risen. The cause of death was undoubtedly shock, as there were no signs of peritonitis.

The tumor was examined by Dr. Whitney and pronounced a lipoma.

The tumor undoubtedly caused the invagination. Projecting from the mucous wall of the cæcum toward the liver, its pear-shaped extremity was grasped by the contracting intestine, and the whole tumor forced along the ascending colon, inverting the caput cæci, and dragging with it the ileo-cæcal valve and small intestine. This process continued until the tumor reached the sigmoid flexure, and the tightened mesentery would allow no further invagination.

A CASE OF RETRO-PERITONEAL CYST OF CONGENITAL ORIGIN IN A CHILD OF THIRTEEN MONTHS; REMOVAL; RECOVERY.

By MAURICE H. RICHARDSON, M.D.,
BOSTON.

John F., a patient of Dr. Bowers, of Clinton, Mass., was a seven months' child. At birth it was noticed that there was a tumor in the abdomen. This subsequently enlarged, in proportion to the growth of the child, till last December, when it seemed to grow faster, impeding both circulation and respiration. In September, when the baby was nine months old, the tumor became distinctly smaller and its outline could easily be seen.

In January, 1892, the child was seen by Dr. F. C. Shattuck, who advised an exploratory laparotomy, and kindly referred the case to me.

When admitted to the Massachusetts General Hospital, February 16, 1892, the child, a well-nourished boy, presented a fluctuating tumor, filling the whole abdomen and apparently attached to or arising from the left. The tumor was evidently a cyst of some kind. It was impossible to make a diagnosis. The prevailing opinion was in favor of a hydronephrosis. There were no symptoms pointing to the kidney, however, and nothing in the urine suggested a renal origin. There was much dyspnœa from upward pressure, which was complicated by an attack of bronchitis. After observing the case for some days, it was agreed that an exploration was advisable. On February 23, 1892, a median incision was made between the umbilicus and the xiphoid cartilage, which exposed a thin-walled cyst containing seven pounds of slightly opaque fluid. The cyst-wall was covered with peritoneum and contained many large vessels radiating from its base. One large vein, evidently the splenic, crossed the pedicle at its attachment to the pancreas. The tumor was separated from its place of origin by stripping with the fingers its peritoneal covering. The

posterior attachment was retro-peritoneal, and was thought not to be connected with the pancreas except by contiguity. In separating the base of the cyst from the surrounding structures I observed that the tail of the pancreas was spread out over the anterior wall of the tumor, where it became gradually thinned until its structure could not be recognized and was lost in the peritoneum. The abdomen was closed without drainage, and a rapid and uneventful recovery followed. The child remains well.

Drs. Fitz and Whitney reported the cyst to be retro-peritoneal and of congenital origin. The fluid contained no evidence of a pancreatic source. More detailed examination showed true pancreatic tissue in the cyst-wall, and suggested the pancreas as the seat of the disease. My own observations at the time convinced me that the pancreas involved the cyst-wall by contact only, and that the thin, flattened pancreatic wall was the result of pressure. The cyst, starting behind the pancreas, pushed that organ before itself and appeared in the space between it and the transverse colon. As the tumor increased in size the layer of pancreatic tissue became thinner and thinner until it was lost at the surface which presented in the wound.

In two cases of pancreatic cyst caused by a dilatation of the canal of Wirsung I have found enucleation impossible. The cyst-wall has been everywhere intimately adherent. While it probably would be easier to separate such a cyst in a child than in an adult, yet I do not believe that the procedure would be entirely without difficulty. In this case there was no trouble whatever in separating with the finger the cyst-wall from all its attachments after the peritoneal covering had once been started.

I have not been able to find a similar reported case, and look upon this one as unique.

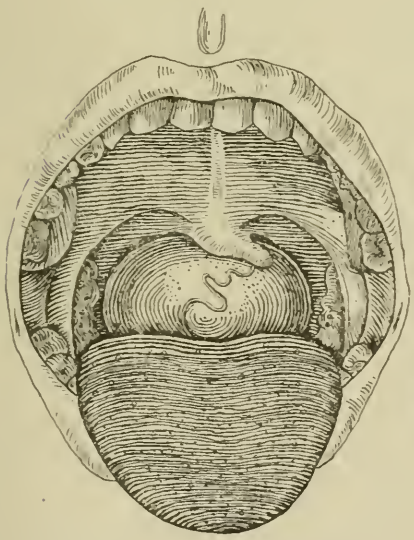
A CASE OF ENLARGED ACCESSORY THYROID GLAND AT THE BASE OF THE TONGUE.

BY J. COLLINS WARREN, M.D.,
BOSTON, MASS.

BENIGN tumors of the mouth and tongue are sufficiently rare to authorize careful study. The case reported here serves to throw light upon a group of growths whose etiology has hitherto been but imperfectly understood.

Mrs. L. E. S., fifty-two years of age, was sent to me in April, 1892, by Dr. F. I. Knight for treatment of a tumor of the tongue. She

FIG. 1.



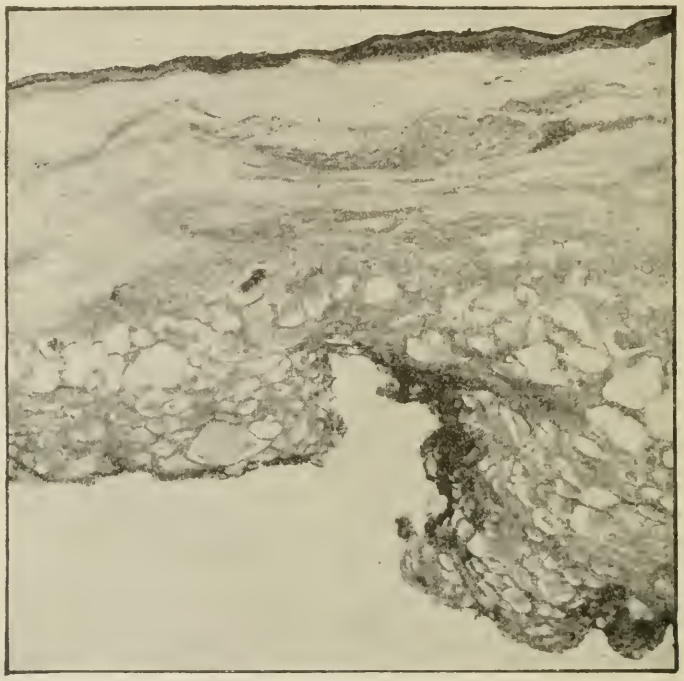
Showing position of tumor with tongue protruding as far as possible.

FIG. 2.

Microscopical section—high power.

was born in Springfield. Her parents both died of consumption, but she herself has enjoyed good health, with the exception of two attacks of pleurisy, the last nine years ago, and is at present stout and strong, and is the mother of three children, all of whom are well. She first noticed a lump in her throat about twenty-two years ago, shortly after

FIG. 3.



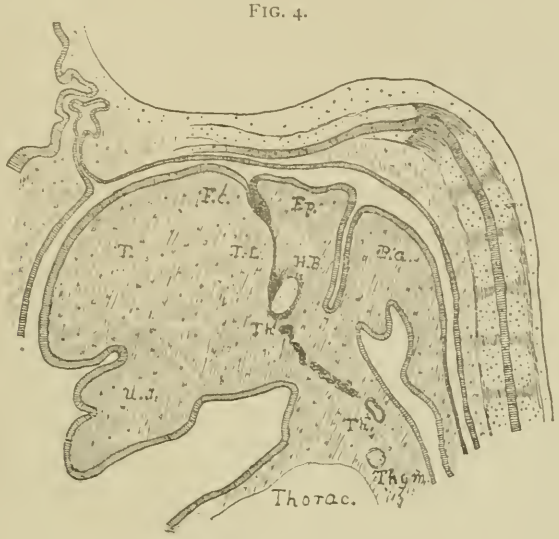
Photograph of section—low power—showing relation of glandular tissue to capsule.
a. Capsule. *b*. Delicate thyroid tissue partly bruised.

her youngest child was born. She was at that time suffering from a "bronchial" affection, and a physician who examined her throat discovered the tumor. Since that time it has been slowly but steadily increasing in size. During an attack of grippe this winter the tumor became swollen and inflamed, and after that the lump seemed to settle back on to the windpipe, and has since caused considerable irritation, obliging her to hawk and spit constantly. The catamenia ceased

about five years ago, but no special change in the tumor occurred at that time.

An examination of the throat showed a tumor about the size of a hen's egg (Fig. 1) situated at the base of the tongue. An examination with the laryngoscope by Dr. Knight showed that it was in no way connected with the epiglottis. On introducing the forefinger the posterior surface of the tumor could be reached with some difficulty,

FIG. 4.



Thyroglossal track. After HIS.

T. Tongue. U.J. Under jaw. Thorac. Thoracic cavity. Ep. Epiglottis. H.B. Hyoid bone. F.C. Foramen cæcum. T.L. Tractus lingualis. Th–Th. Thyroid gland. Thym. Thymus gland. P.a. Arytenoid fold.

and the existence of a space between it and the epiglottis could be determined. It was covered with normal mucous membrane, and a tortuous vessel of considerable size could be seen running over the anterior surface. The tumor appeared to occupy the lower portion of the pharynx when the parts were quiescent, and it was only by drawing the tongue forcibly forward that it could be brought well into view. Removal was advised, and the operation was performed May 4, 1892. After etherization a ligature was passed through the tip of the tongue, and the jaws were held open by a gag. As the tumor could not be drawn forward into the cavity of the mouth in this way,

two additional ligatures were passed through the dorsum of the tongue on either side of the tumor, in the region of the papillæ circumvallatæ. Traction upon these threads brought the whole tongue forward, so that the tumor presented between the incisor teeth and could easily be operated upon. An incision was made on the median line, and the tumor was, with slight difficulty, enucleated from its position. It appeared to be situated just beneath the mucous membrane, and did not involve the substance of the tongue. A portion of the redundant mucous membrane was excised on either side, and the edges of the wound were brought together with catgut sutures. Three vessels required ligature, one of them being of considerable size. The patient made an uninterrupted recovery, and two weeks later returned to her home in Springfield.

The following is the report of Dr. W. F. Whitney, of the Harvard Medical School, upon the microscopical structure of the tumor:

The tumor, which had been somewhat torn during removal, was a rounded, slightly lobulated growth, the size of a small plum. The outer surface was in general smooth and fibrous. The section surface was of a reddish-yellow color, slightly translucent, and marked by minute cysts filled with a viscid yellowish colloid material

The bulk of the growth was found, upon microscopic examination, to be made up of closed cavities varying in size from 0.07 to 0.40 mm. in diameter. The walls of these were clothed with a low cylindrical epithelium, which, in the smaller, seemed nearly to fill the opening, while in the larger it formed simply a lining, the rest of the space being occupied by a homogeneous substance, staining deeply with picric acid or eosin. The formation of this material by the transformation of the cells could be readily seen in the smaller cysts. The walls separating the cavities were of a fibrous structure, with relatively few nuclei, varying in width from a mere line to a band of some width. This was directly continuous with wider bands, which divided the growth into irregular, illy-defined lobules, and was spread out upon the surface as a sort of capsule. In places vessels were very abundant.

The structure is that of a ductless gland with colloid degeneration, and in all its essential histological details corresponds to the thyroid.

From an embryological point of view a thyroid inclusion is perfectly possible at the place from which this tumor was removed. For, accord-

ing to the latest investigations,[1] the middle lobe of the thyroid is developed in a track which is directly continuous with the foramen cæcum of the base of the tongue. And this track is still frequently marked in the adult by the so-called processus pyramidalis, a continuation of the middle lobe to the hyoid bone, and more rarely by the accessory thyroid glands described by Zuckerkandl and Kadyi as glandulæ supra and epihyoidea. From these it is but a short step to the foramen cæcum and the site of this growth. So, from a consideration of the structure and of the development, there is little doubt that the real nature of this exceedingly rare tumor must be that of the thyroid gland.

A search through literature shows that tumors in this region are rarely observed. Mr. Henry T. Butlin reports, in 1890, two cases of a similar nature.[2] The first occurred in a female thirty-two years of age, and was thought to be about the size of a hen's egg. Tracheotomy was performed, and the tumor was removed through the mouth by an incision in the median line, and scooping out the soft mass. There was a recurrence, but the tumor remained much smaller in size. The second case was also a female, twenty-three years of age. The tumor, which had existed two years, and was smaller than the former, was removed by the galvano-cautery loop. Butlin has succeeded in collecting eight cases, including the two above mentioned. They were all females, and the ages varied from infancy to thirty-two years. One case is reported as existing near the tip of the tongue, and it seems doubtful, therefore, whether it should be placed in the same category. In one case the tumor was very large, and caused the death of the infant a few hours after its birth. In the case reported by Bernays, of St. Louis, there was decided swelling in the middle line of the neck beneath the root of the tongue, and the bulk of the tumor appears to have been in the substance of the organ. Both Bernays and Sutton have regarded these tumors as accessory thyroid glands. Butlin agrees with this view, although previously he considered them simple adenomata. Mr. Bowlby is, however, of the opinion that

[1] His: "Du Tractus thyreoglossus und seine Beziehungen zum Zungenbein," Arch. f. Anat. u. Physiol., anatom. Abtheil., 1891, S. 26.

[2] Clinical Society's Transactions, vol. xxiii. p. 118.

these tumors are derived from the follicular glands at the back of the tongue.

I have myself twice seen tumors on the dorsum of the tongue which were probably of this nature. One was a small tumor removed from the dorsum of the tongue by one of the surgeons of the Massachusetts General Hospital some twenty years since. It was given to me for microscopical examination, and consisted of tissue resembling closely that of the thyroid gland. The second case was seen by me in May, 1888, in consultation with Dr. Knight. The patient, Miss T., was about twenty-one years of age, and the tumor, according to Dr. Knight's report, was "about the size of the last phalanx of my ring finger." It gave her but little trouble; no operation was advised, and the patient has since been lost sight of.

Wölfler, in his monograph on *Goitre*, which has recently appeared, mentions the case reported by Wolf (one of those included in Butlin's series), as the only one to be found in the literature of the subject.

It is well to remember that accessory thyroid glands, both lateral and median, may develop into tumors. Among these may be included mucous cysts situated near the hyoid bone, or stretching in tubular form from the foramen cæcum to the hyoid bone. Some of the retro-sternal types of goitre owe their origin to those accessory glands which are situated close to the aorta

Tumors below the angle of the jaw or beneath the sterno-mastoid muscle, as well as retro-pharyngeal, intra-laryngeal, and intra-tracheal tumors, owe their origin to lateral accessory thyroid glands. (Wölfler.)

The ease with which the base of the tongue was brought out of the mouth in this case is worth noting. This was due probably to the relaxation of the parts, caused by the pressure of a tumor of this size; but, in part, also to the ligatures passed through the base of the tongue. The posterior pillars of the fauces were made tense by this manœuvre. By dividing them the tongue could have been brought still further forward had it been necessary.

ULCER OF THE STOMACH; PROPOSED SURGICAL TREATMENT.

By E. H. BRADFORD, M.D.,
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Ulcer of the stomach has hitherto been regarded and treated as a medical affection rather than a surgical one, and in a large percentage of cases recovery takes place. But in a by no means small proportion, death eventually results; and modern surgery, which is ambitious to attempt cure in all hitherto incurable affections, is ambitious to render relief in this as in all other desperate conditions. The recent excellent article of Dr. Weir has called attention to the advisability of considering operation in all cases of perforating ulcers of the stomach. Some Continental surgeons have reported cases where a cure has followed surgical interference in cases that were not perforating, but the method and technique of such operations have not been formulated or carefully considered.

The following case presented itself for operation under the supposition that it was a case of ulcer of the stomach, and although this diagnosis proved to be incorrect, yet the rarity of the procedure justifies a report, errors being frequently as instructive as successes:

The patient was a woman, twenty-five years of age, with the symptoms of ulcer of the stomach persisting for four years. There was almost daily emesis, and frequent vomiting of blood was reported to have occurred. The patient had been in the hospital several times, had been discharged with improvement, and had reëntered with an aggravation in the symptoms. She claimed to suffer from great pain in the hypogastric region, so severe that the patient was unable to

walk or lie flat, and, in fact, had been confined to her bed for several months. The patient was not extremely emaciated, but was thin. The condition seemed to justify operative interference and the examination of the stomach by means of gastrotomy, with the purpose of excision of the ulcer, if one were found.

An incision was made in the median line from the xiphoid cartilage downward. The stomach was found somewhat distended, but without thickening.

The appearance of the stomach was perfectly normal; two fingers were inserted into the abdominal wound, the anterior surface palpated, but no thickening or adhesions were discovered. The stomach was pulled from one side to the other, so that the whole anterior surface could be palpated without difficulty. The cavity of the peritoneum between the stomach and the large intestine was divided a short distance from the border of the stomach, two fingers inserted beneath the stomach, two fingers of the other hand being placed so as to palpate the anterior surface; between the two, the posterior surface of the stomach could be extensively and thoroughly explored, and also any thickening determined. No adhesions were found on the posterior surface, and nothing that was abnormal determined. The stomach was then incised, in order to see if any small ulcerations existed; an electric light was inserted, and the inner side of the stomach was easily seen, but neither by this nor by the fingers could anything abnormal be determined. The wounds were therefore sewn and dressed with the ordinary aseptic dressing.

The patient's history after the operation was an entirely uneventful one. There was no shock, and there was a rapid recovery from the operation. Although the patient's stomach had been thoroughly overhauled and washed out, and an electric searcher introduced, there was no increase of symptoms and there was a diminution of the pain and vomiting. The patient, moreover, began to improve, and in a few weeks resumed ordinary diet, gained flesh, and walked about. Vomiting occasionally occurred, but less frequently than before the operation, and the patient became able to do light work, and was discharged from the hospital three months later.

It would appear, from what was found at the operation, that the case was purely a functional rather than an organic one, and that the operation was unjustified by the actual condition of

things, its beneficent effect being due probably to the mental effect rather than to any surgical treatment.

Yet the case has some interest, illustrating the readiness with which the operation of gastrotomy can be performed and the little constitutional disturbance which may follow from the operation itself. It also illustrates the readiness with which the stomach could be explored for ulceration, and suggests the proper steps for the treating of the true ulceration of the stomach in a grave and desperate condition of affairs, where a recovery by conservative means seems impossible.

In the individual case there was one emergency which should be noted as a warning. In order to secure thorough asepsis, the stomach, as soon as it was opened, was washed out by means of a glass funnel and tube, by flushing with a solution of boric acid (4 per cent.). Through an error on the part of the attendant, the glass funnel was raised somewhat higher than was intended, and there was a little delay in lowering it below the operating-table to secure siphonage. It was suddenly noticed that the patient became blue, and it was found that some fluid had passed up the œsophagus into the larynx and threatened drowning. Means of artificial respiration brought the patient to a normal condition, but death could easily have taken place if a greater amount of fluid had entered the larynx, or if the patient had not been promptly attended to. It should, therefore, be remembered in such cases that only a small quantity of water should be used to wash the contents of the stomach, and that the source of supply—namely, the glass funnel—should not be placed so high as to overcome the resistance at the cardiac end of the stomach.

Ulcers of the stomach are usually small, and, in the majority of instances, heal; but the existence of large ulcerations of the stomach which eventually result in perforation, or which kill by interference with digestion, is a matter of common pathological knowledge. In the Warren Anatomical Museum, at the Harvard Medical School, seven specimens of ulcer of the stomach are preserved. In one of these the ulcer is two inches in width and three inches in length, and of a depth at its deepest part

of half an inch. In the smallest of these, the ulcer is at least half an inch in width. These ulcers represent the severer and fatal class of chronic ulcers, and although ulcers of the smallest dimensions might be overlooked after a laparotomy, these larger ulcers would be readily recognized; and the question is a pertinent one, whether surgical measures may not be employed for ulcers of this class where medical treatment has been proved useless.

Operation for ulcer of the stomach has been done chiefly in the desperate condition of perforation. The mortality is extremely high. If operative treatment, as in the cases of Czerny, had been done earlier, perhaps better results could be obtained.

The following cases of operative interference for ulcer of the stomach have been collected for me by the kindness of Drs. Munro and Coggeshall, and an abstract of them is given:

Basil's Case (*Manchester Med. Chron.*, 1887, vol. vi. p. 131).—A woman, æt. twenty-three. Had had epigastric pain with vomiting for three years, but no hæmatemesis or melæna at any time.

Condition on entrance. Pulse 134, temperature 101°; the abdomen greatly distended, displacing the heart upward, tympanitic; mind clear. A brown liquid with reddish shreds was drawn from the stomach by stomach-tube.

Operation. A. C. E. mixture; median incision two inches long. Odorless gas escaped from the peritoneal cavity on incision. Some serum-like fluid was found in the peritoneal cavity. Cavity washed out with solution sod. chlor., ½ per cent., and sewed up, no ulcer having been detected. Death on the sixth day.

Post-mortem, eight hours after death. Two perforating ulcers found. One, one and a half inches in diameter, opened into a cavity whose lower and posterior walls were formed by the liver, which was closely adherent; this was situated one inch behind the lesser curvature at its middle point; the other, two inches below the lesser curvature, one inch in diameter, and rested upon the middle third of the pancreas, which was eroded at the point of contact.

Case of Drs. Gannett and Mixter (*Bost. Med. and Surg. Journ.*, January 10, 1889).—Stationary engine driver, æt. fifty-seven; otherwise healthy. Had had two previous attacks of hæmatemesis, followed by melæna, within five years. Third attack had lasted eleven

weeks, when he entered the hospital. It began with hæmatemesis and epigastric pain. The pain required morphine constantly for the last fortnight before entrance. The vomiting was increasing. He was put on milk diet, but continued to vomit blood and to lose strength. Laparotomy was decided upon as affording his only chance of life.

The symptoms gave no indication of the seat of the ulcer. Condition at time of operation fair, and he rallied well. Incision close to xiphoid cartilage, and going right down to peritoneal cavity. Stomach was drawn out. Whole anterior surface was normal, but pylorus was very much thickened and firmly adherent. It felt exactly like a malignant growth. It could not be moved because of attachment to the pancreas. Stomach replaced and the wound sewed up.

Post-mortem. Within the pylorus, on its posterior aspect, an oval ulcer with overhanging edges, and near the bottom of it an erosion in the pancreatico-duodenalis artery about the size of a large steel knitting-needle. The vessel, from its position, could not have been tied had the stomach been opened.

Sainsbury's Case (*Lancet*, 1891, vol. i. p. 18).—Male, æt. fifty. Had had indigestion with heartburn for ten years, with occasional hæmatemesis and questionable history of melæna. Epigastric pain very severe on entrance to hospital. Great loss of weight. Midway between xiphoid cartilage and umbilicus a round tumor, two inches in diameter; slight tenderness. Diagnosis: cancer of pylorus. One month after entrance, symptoms having increased, operated upon by Mr. Burrow. Six-inch incision in linea alba from xiphoid cartilage. The tumor could now be grasped in the region of the pylorus, intimately connected with the pancreas. Omentum turned aside, and a point in the jejunum selected that would lie easily on the surface of the stomach: contents squeezed out and ligature made. Incision one and a half inches long made in the gut and in the stomach wall, and the two united and external wound closed. Death two days later.

Post-mortem. Stomach much distended and position nearly vertical. A large, thick-edged, sharply cut, oval ulcer in the pylorus, the floor of which was formed by the eroded surface of the pancreas, which was closely adherent to the pylorus.

Lockwood's Cases (*Lancet*, 1891, vol. ii. p. 1164).—A clerk, æt. twenty-eight. Four days before entrance seized with sudden severe pain in left side. Tumor to left of umbilicus. Nausea and constipation. Two days later, stercoraceous vomiting. Mechanical obstruc-

tion of bowels was supposed to exist. Incision was made in linea alba to left of umbilicus. Foul gas escaped; the pelvis almost full of pus. No perforation could be found. Death in seven hours.

Post-mortem. Septic peritonitis, its chief focus being beneath liver. Upon the front surface of the duodenum was a small oblong opening with clean-cut edges.

Male, æt. forty-one. Suddenly seized with pain in abdomen, followed by obstipation and stercoraceous vomiting. Pain very severe. On the chance of mechanical obstruction an operation was performed. No obstruction found, but septic peritonitis. Death ten hours later.

Post-mortem. Septic peritonitis, most intense in hepatic region. A small round perforation on posterior wall of the duodenum one inch from the pylorus.

Abbe's Case (*New York Med. Journ.*, May 2, 1891).—A woman. Had hæmatemesis for a month past, and some pain in epigastrium. Four days after entrance vomiting was renewed; temperature 105°. Diagnosis: impending perforation.

Operation. Anterior wall of stomach appeared normal. Posterior surface thoroughly examined through a rent made in the omentum. Pylorus seemed hard, and an incision one and a half inches long was made in the anterior wall. Pylorus was found normal. Through this opening the wall of the stomach was brought into view over almost its whole surface, and nothing was found. Death the next day.

Post-mortem. On both anterior and posterior walls of stomach several shallow ulcerations were found, which could not be detected by palpation from the exterior, and were not easily recognized by the eye.

Simon and Burling's Case (*Brit. Med. Journ.*, 1892, vol. i. p. 63).—Girl, æt. twenty. Indigestion for year past. Two days before entering the hospital she was seized with sudden severe pain in left upper abdomen, with some nausea. Abdomen somewhat distended, and tender in epigastrium and right hypochondrium. Extreme symptoms of peritonitis developed during the night after admission, and operation was decided upon, as perforating ulcer was suspected. Abdomen opened in median line above umbilicus to one and a half inches from ensiform cartilage. Slight peritonitis in this neighborhood. A collection of semi-purulent fluid between right lobe of liver and the stomach. A perforation in the wall of the stomach, one-half inch in diameter, corresponded to this collection. This was closed

by five silk sutures on Lembert's method. The abdomen was flushed with hot water, and Keith's tube placed between the liver and stomach. Death thirty hours later.

Post-mortem. The perforation on the anterior surface of stomach was somewhat nearer the lesser than the greater curvature. A second ulcer, nearly perforated, was found on posterior wall of the stomach. The perforated ulcer had been effectually closed, and death seemed due to the previously existing peritonitis.

Nissen (*St. Petersburger medicinische Wochenschrift*, October, 1890, No. xli.) relates a case of circular ulcer of the stomach from the clinic of Professor Unverricht. The patient was a man, æt. forty-six years, who had had the usual signs of an ulcer of the stomach since July, 1887. His disease progressed with the usual symptoms of violent pain in the epigastrium, vomiting of blood, and progressive wasting, until September, 1889, when the symptoms pointed to perforation of the ulcer with commencing peritonitis. Professor Wahl thereupon opened the abdomen by an incision in the linea alba between the umbilicus and ensiform cartilage. There was no free gas in the peritoneal sac, and the stomach was easily made to present itself in the wound. Neither palpation nor inspection showed anything abnormal either in front or behind, and its serous coat was smooth and shining, although rather too vascular. There was no peritonitis, however, and nothing to bear out the clinical signs. The abdomen was closed, and the patient progressed fairly well for some days, but a month after the operation his temperature rose; there was pain in the abdomen, culminating in collapse, of which he died. The clinical diagnosis was that of a perforating ulcer of the stomach with consecutive peritonitis. An examination was made, and the left lobe of the liver was ascertained to be adherent to the stomach, and when the adhesions were broken down a small perforation was found in the front wall of the stomach. This hole had allowed the contents to escape into the peritoneal cavity. The stomach itself was hour-glass shaped, and had a large ulcer at its lesser curve and extending down the front, where it had given way.

Weir's Case (*Internat. Med. Magazine*, February, 1892, p. 12).—Female, æt. fifty-seven. Occasional attacks of pain in stomach, and vomiting, but never blood. Four days before entrance, severe pain in belly; chill; continued vomiting of spinach-green fluid, and marked prostration. At time of examination the pulse was 100, feeble; temperature 100°. Abdomen swollen and tender. Dulness in right

hypochondrium and iliac fossa. An incision four inches long was made from the umbilicus downward. Intestines glued together; no gas or fluid. The abdominal organs were examined, and a circular opening was felt by the finger-tip. This was found to be a round ulcer, with smooth, hard edges in the middle of the anterior surface. The opening was partly adherent to the liver, and was in communication with an abscess cavity which contained six or eight ounces of gruel-like pus. The edges of the opening were brought together by sutures. Collapse extreme, patient dying soon after operation.

Weir, in his article, also gives the following collected cases:

"Mouisset, 1890. Laparotomy for perforating ulcer in a man, thirty-four years of age. Operation showed perforation on anterior wall. Death at end of operation.

"Czerny, 1885. Woman, aged twenty, with history of previous gastric difficulty. Was attacked with sudden pain in left side of abdomen, followed by tympanites and tenderness. Operation, but no perforation found. The patient died in three days, and at the autopsy a perforation was found in the anterior wall.

"Czerny, 1887. Man, aged thirty-five. Eight years before had had signs of ulcer. Two days previously signs of perforation appeared suddenly. Operation, and perforation found on anterior wall, which was closed with silk sutures. Death in six hours.

"Postempski (Rome). Man, aged twenty-seven. Suffering from ulcer of stomach. Laparotomy was performed; then an exploratory incision was made through the stomach wall to determine the site of the ulcer. This was found, the incision was closed, the ulcer cut out, and its edges closed by sutures. The patient recovered.

"Mikulicz, 1880. Man, who had suffered from gastric symptoms for several years, was seized with sudden abdominal pain. The operation disclosed a perforation on the anterior surface. This was closed by sutures. The patient died in three hours."

The majority of these operations were done in emergency, and there is little in the text-books of surgery to guide as to the proper procedure in these cases. It is also true that we are at present unable to diagnosticate the location of the ulcer, and therefore the surgeon who undertakes a case of this sort should be prepared for various emergencies.

Perhaps the case which the writer here reports may serve as of some use if the suggestions as to treatment in future cases which came to mind during this operation, and in the operative procedures upon cadavers preparatory to the operation be formulated and presented for consideration and criticism. These suggestions are made with a full appreciation of the facts that they are theoretical; but they are warranted by experiments upon cadavers, by operations upon the stomach itself for the removal of malignant disease, and upon pathological consideration.

The case that is here presented would seem to demonstrate clearly that exploratory laparotomy or gastrotomy is a comparatively harmless procedure, and in grave cases diagnosis can be made certain. It is also clear that the stomach can be explored with reasonable thoroughness. Abbe's case shows that a new ulceration may be present and escape detection, even after exploratory incision; but the larger ulceration certainly cannot be overlooked.

Ulcerations in the cardiac orifice might escape detection; but in this region ulceration is rare.

The experience of other surgeons, as well as the case here reported, would seem to warrant my assertions based upon the case here reported, that the stomach could be easily brought into the operative field, and an incision for operation would not be so difficult as an incision for malignant disease. In undertaking a case of ulceration the surgeon must be prepared to meet with the ulcer at various portions of stomach, and the following rules are suggested for guidance, according to the situation of the ulceration:

Ulcers of the Anterior Surface.—When the ulcer is on the anterior surface it can readily be detected as soon as the abdominal wall is opened. If the stomach is not directly adherent to the peritoneum exploration by palpation will be needed. On palpation of the stomach wall, thickening will be felt. The operation that suggests itself in this condition is an excision of the ulcer and a suture of the walls of the stomach after removing the ulcer. If the ulcer, however, is a very large one and

excision not practicable for that reason, the stomach can be temporarily sewed to the walls of the abdomen and a gastric fistula left. An ulceration of this size seems hardly probable.

Ulcers on the Lower Margin.—In this situation excision would be the procedure most readily done.

Ulcers on the Posterior Surface.—Ulcers on the posterior surface near the lower border can be recognized as readily as on the anterior surface, and they can be treated in the same way by excision. If, however, the ulceration is on the upper border it is reached with more difficulty. The condition can ordinarily be recognized by passing the hand behind the stomach. The whole stomach can be palpated by the fingers of both hands, one hand being placed behind the stomach, the hand being passed through the opening made into the cavity of the omentum below the lower border of the stomach, the other hand being placed on the anterior surface of the stomach. Where adhesions take place there is greater difficulty in recognizing the extent of ulceration, and in these instances an opening of the anterior walls of the stomach will be necessary. If this is done, the size of the ulceration can be readily determined. If adhesions exist, uniting the posterior wall of the stomach to the tissues beneath it, the condition is one which requires the exercise of considerable judgment. If the adhesions are slight, they can be readily separated in the same way that intestinal adhesions are separated—by careful use of the finger; but where they are firm and the exercise of force is needed, separation of the adhesions would be impossible, owing to the neighborhood of the lymphatic vein. Under these circumstances excision of the ulcer would be impossible. This is also the case if the ulcer is situated so near the duodenum as to prevent complete excision. In both these instances the steps about to be described suggest themselves as of advantage.

Where the ulcer is an extremely large one and lying near the pyloric end, or in the duodenum, preventing excision, or where adhesion to the posterior tissues is so great that the stomach cannot be brought forward, any operative interference in this direction seems impossible. The surgeon will find, however,

that the following steps may be feasible: The stomach can be divided as if for an excision of malignant disease; the healthy portion can be sewn as in section of the stomach; the portion of the stomach containing the ulcer can be brought forward and stitched to the abdominal wall; an intestinal anastomosis can be made, uniting the healthy portion of the stomach to the intestines; this enables digestion to go on without irritating the ulcer, and the ulcerated surface can be treated through the opening in the abdominal wall by irrigation.

A CASE OF FOREIGN BODY IMPACTED IN THE LARYNX. TRACHEOTOMY; REMOVAL OF A PIECE OF BONE THROUGH TRACHEOTOMY WOUND AFTER SIX MONTHS.

By H. R. WHARTON, M.D.,
PHILADELPHIA.

Charles H., aged three years, was admitted to the Children's Hospital, January 5, 1892, with urgent symptoms of dyspnœa, which had come on while he was eating, a few hours before his admission to the hospital. The symptoms of dyspnœa being extremely urgent at the time of his entrance to the hospital, Prof. Ashhurst, under whose care he came, opened the trachea, which entirely relieved the dyspnœa, but a careful exploration of the larynx and trachea failed to locate the presence of a foreign body. Further search for the foreign body was not made at this time, as one of the assistants at the operation stated that when the trachea was opened he felt a small body strike him on the forehead, and it was supposed that the foreign body may have been a small one which escaped from the air-passages in this way. A No. 3 tracheotomy tube was introduced and the child breathed comfortably through this and had no further dyspnœa.

At the expiration of two weeks an effort was made to remove the tracheotomy tube permanently, but it was found necessary to reintroduce it in a few minutes, as the child rapidly became cyanosed and developed urgent dyspnœa.

On February 12th, the patient was attacked with pneumonia and became very ill, so that for several weeks no further attempt was made to remove the tube permanently; he, however, entirely recovered from the pneumonia. After this time several unsuccessful efforts were made to remove the tracheotomy tube.

When I entered upon my term of service at the hospital the case came under my care, and I removed the tracheotomy tube and intro-

duced an intubation tube; and, although for a few minutes the breathing was carried on satisfactorily through this, its introduction was always followed by a certain amount of hemorrhage, and it was finally coughed out of the larynx.

A careful laryngoscopic examination was made, and it was reported that no foreign body could be seen in the larynx or trachea. Thinking that the difficulty in the permanent removal of the tube might be due to the presence of granulations about the edges of the tracheal wound which acted as a valve in closing the tracheal wound on inspiration, I removed the tube and dilated the wound, and found a number of granulation tumors adherent to the mucous membrane around the edges of the tracheal wound.

With the object of removing these tumors I etherized the patient and removed the tube and enlarged the wound in the neck, which, after the removal of the tube, simply represented a sinus leading down to the trachea, until I had a free exposure of the wound in the trachea. A number of granulation tumors, some of them as large as a grain of wheat, were exposed, which were removed with forceps and scissors. I next explored the larynx from the tracheal wound by passing a wax bougie through it into the mouth; and in passing this I thought I detected upon the left side of the larynx a roughened surface, which on further exploration with a metallic probe proved to be a foreign body impacted under the left vocal cord: this I was finally able to grasp with delicate tracheal forceps introduced through the tracheal wound, and remove. The foreign body proved to be a piece of beef

Bone removed from larynx (actual size).

bone, triangular in shape, one-half inch on each side and one-sixteenth of an inch in thickness, which had remained in the larynx for more than six months. The tracheotomy tube was introduced after the operation and was allowed to remain for a few days until all signs of local irritation had subsided; it was then taken out and allowed to remain out each day for a time—as long as the patient could breathe comfortably without it.

By the end of a week after the removal of the foreign body the child was able to breathe comfortably for an hour and a quarter

without the tube. After making several of these temporary removals of the tube, it was removed permanently; the wound in the neck gradually contracted, and the patient was discharged from the hospital on July 24th.

The above case presents many points of interest in connection with the difficulty in locating the position of the foreign body and in the permanent removal of the tracheotomy tube, and I think clearly demonstrates the advantage of making a careful enploration of the larynx in all cases of this nature when there is difficulty in permanently removing the tracheotomy tube.

The presence of granulation tumors about the tracheal incision should also not be lost sight of in any case in which a tracheotomy tube has been worn for some time, for I think in many of these cases the dyspnœa which occurs after the removal of the tube is due to their presence, so that in all such cases I consider it good treatment to open up the wound and expose them and remove them by a curette or scissors. When the wound in the neck is still unhealed it is often possible to dilate it and destroy the granulations by applying the solid stick of nitrate of silver. The hemorrhage which in this case followed the introduction of the intubation tube was probably due to the injury of the granulations surrounding the foreign body, and it was the blood which blocked the tube and rendered it useless and caused it to be coughed up, as the extremity of the tube occupied a position below that of the foreign body.

SUPRA-PUBIC CYSTOSTOMY:

ITS FREQUENT UTILITY, AND AN APPLIANCE FOR PREVENTING THE CHIEF ANNOYANCE ATTENDING A PERMANENT OPENING IN THE BLADDER.

By FREDERIC HENRY GERRISH, M.D.
PORTLAND, MAINE.

The operation of opening the bladder by an incision above the pubic symphysis is thoroughly established as a legitimate procedure, though its superiority to perineal incision in various cases is by no means fully appreciated by the profession. Its employment for the removal of calculi and vesical tumors, for prostatectomy, for the topical treatment of ulcerated surfaces, tuberculous and other, for temporary drainage and rest of the organ, needs no special advocacy in this presence. In these classes of cases one object which the surgeon almost invariably has in mind is the ultimate closure of the artificial opening. In some instances, however, great benefit to the patient results from supra-pubic cystotomy, performed with the intention of creating permanent drainage. For example, in marked hypertrophy of the prostate, where as severe an operation as prostatectomy is contra-indicated by the feebleness of the patient, or is prohibited by his ill-advised opposition, permanent drainage is often desirable—sometimes, indeed, imperatively demanded. To this procedure, undertaken for the especial purpose indicated, the name *Cystostomy* (κύστις + στόμα) may properly be applied, as a term of convenience, signifying the formation of a mouth, or fistula, in the bladder.

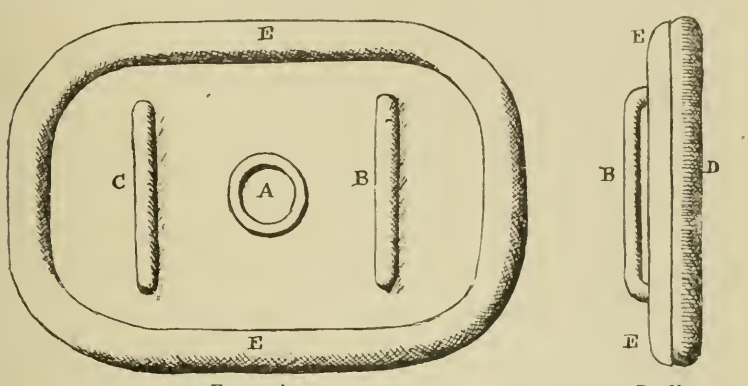
The objects of this paper are, first, to call attention to the importance of supra-pubic cystostomy, as distinguished from

cystotomy; and, second, to describe a little device which has served excellently in carrying out certain details of the after-treatment. The apparatus is so simple that it is quite probable it has been invented before; but it has not been my fortune to see or even to meet with a description of such an appliance.

After the parts around the aperture have healed, and there is a perfect continuity between the mucous membrane of the bladder and the skin of the hypogastrium, if the intra-vesical difficulties have been relieved by the operation, the patient suffers only—or, at all events, mostly—from the constant flow of fluid over the abdominal surface. The apparatus is designed to prevent this annoyance, which is so serious as to make the patient's life wretched by keeping the skin drenched with, and his person constantly odorous of, urine.

It consists, first, of a plate of pure silver, about eight centimeters long and a little more than five centimeters wide. The corners are rounded, and the entire marginal portion is grooved on the posterior surface, a transverse section of this gutter representing nearly a semicircle with a diameter of seven millimeters. Into this groove is cemented a piece of soft, pure rubber tubing, with a diameter slightly exceeding that of the groove. One end of the tubing is fastened to the other end with cement, so that an air-cushion is formed. In the centre of the plate is a circular perforation, seven millimeters in diameter, surrounded by a narrow collar. On the front of the plate, midway between the centre and each end, is a silver bar, firmly attached at each of its extremities, and leaving a space of three millimeters between its hind surface and the anterior surface of the plate. A piece of thick-walled rubber tubing of suitable size and thirty centimeters long, is secured in the central aperture. The plate is applied so as to centre on the stoma of the bladder, and is held in place by bands like those of the ordinary elastic truss—that is to say, first by an elastic belt around the ilia, with tips of inelastic webbing, which are looped around the bars, and buckled to the proper degree of tension; and second, by two perineal bands of rubber tubing, fastened behind to the belt by loops of inelastic webbing, and in front

to the bars by metal hooks. The tube from the central opening is conducted to the bag of a rubber day-urinal, which is strapped to the inside of one of the thighs. The air-cushion on the margin of the posterior surface of the plate, being held firmly against the abdominal wall around the stoma—but at a sufficient distance from its edges to avoid chafing—prevents the leakage of urine, all of the fluid being carried off by the conduit to the urinal.



Front view. Profile.

A. The central aperture, surrounded by a collar for the support of the tube leading to urinal.

B, C. The bars for the webbing loops at the ends of the belt, and for the hooks of perineal bands.

D. The air-cushion at margin of back surface.

E. The rim, convex in front, concave behind, for holding the air-cushion.

An illustrative case will emphasize the description, and also show the utility of the operation for permanent drainage.

On the 6th of October, 1891, I was called to see a gentleman, sixty-nine years of age, who had suffered for several years on account of an enlarged prostate. For two years his health had been failing, and during the recent months the decline had been rapid. He was obliged to empty the bladder at least every hour, and often much more frequently—a procedure impossible without the aid of a catheter, and atrociously painful with it. A prominent surgeon had seen him in consultation with the local practitioner, and advised nothing in addition to the usual medicinal treatment, except daily washing of the

bladder with boric-acid solution. The urine was as thick as turbid coffee, which it resembled in color, being heavily loaded with blood. The hemorrhage was so profuse, the pain so severe, and both so constant, that, when I first saw the patient, it seemed that he could live but a week or a fortnight, unless speedy relief could be afforded him. The supra-pubic operation was proposed as being the least serious and most satisfactory measure which offered hope; but the idea was rejected. A night of rapidly augmented agony, however, produced a change of opinion, and I was summoned to do whatever I thought best.

On entering the bladder, the finger discovered two calculi as large as good-sized filberts, and they were removed. The mucosa was soft and pulpy; the prostate was enormously hypertrophied. Prostatectomy was not attempted, in consideration of the perilous debility of the patient. The margins of the vesical opening were stitched to the skin, and the patient was put to bed with a flexible siphon extending from the cavity of the viscus to a vessel beside the bed. This siphon kept the patient almost perfectly dry, flow of urine over the surface of the abdomen being only occasional and slight.

For several days some anodyne was needed, but in progressively diminishing doses. In about two weeks the appliance here described was adjusted, and the patient was able to sit up with comfort. His strength quite rapidly increased, and he was soon able to walk with ease, and to attend to office business. On the 25th of December he was attacked by the then prevailing epidemic of influenza, and, after an illness of only three days, died. But the two months' trial was a perfect demonstration of the value of the apparatus, and I see no reason for doubting that it would have continued to give as excellent satisfaction indefinitely.

The siphon employed, while the mucous and cutaneous membranes were growing together at the circumference of the opening, consisted merely of a piece of rubber tubing with two holes cut in the sides near the bladder end. This tube was filled with warm water, and its extremities placed respectively in the bladder and the chamber vessel. It has worked so nearly perfectly in various cases that I am at a loss to account for the failure of surgeons generally to adopt this simple and useful device, in the place of sopping up the outpouring urine with

voluminous cloths of absorptive material, or permitting it to inundate the abdomen, and form a pool in which the patient must lie. It is often, perhaps generally, desirable to use the siphon, instead of the other apparatus, when the patient is in bed, thus relieving him of the dangers attending uninterrupted pressure of the plate and its retaining bands.

SUMMARY.—The operation of establishing an opening in the bladder above the symphysis pubis for the permanent drainage of that reservoir is occasionally desirable, and should be performed much more frequently than it is at present.

The name "Supra-pubic Cystostomy" briefly, but sufficiently, indicates the character and purpose of the operation.

The employment of a flexible siphon during the healing of the wound and afterwards, when the patient is in bed, is preferable to other methods of caring for the urine.

The use of an apparatus such as is here described enables the patient to attend to light work with comfort, and prevents the annoyance and suffering which, without some such device, must inevitably follow this useful and sometimes life-saving operation.

RECTO-URETHRAL FISTULA FOLLOWING FRACTURE OF THE PELVIS.

By JOHN B. DEAVER, M.D.,
PHILADELPHIA.

S. G., aged twenty-four years, American; was run over by a cart at the age of three years, sustaining a fracture of the pelvis involving the descending ramus of the pubes and the ascending ramus of the ischium. Immediately following the injury the urine was voided through the rectum. When the patient came under my care, April 18, 1892, having been referred to me by Dr. R. R. Crothers, of Colora, Maryland, the greater amount of urine was still being passed per rectum. Up to the above date five operations in all had been performed, perineal section, etc., but to no effect. Examination of the urethra showed the presence of a callous stricture involving the posterior portion of the pendulous and the anterior portion of the deep urethra through which could be passed, with difficulty, a No. 8 steel sound (French scale). Examination of the perineum showed the presence of a linear cicatrix. Examination of the anus showed a slight prolapse of the rectum with depression of the anterior margin of the anus, evidently the result of the separation following the division of the external sphincter muscle at the time of the perineal section. Examination of the interior of the rectum showed an opening of communication between it and the membranous urethra, directly anterior to the prostate. This opening would engage the point of the little finger. Upon the introduction of a No. 8 (French scale) catheter into the bladder and injecting through it a warm solution of boric acid, it was found that the bladder would contain but four ounces, demonstrating what I believed to be an infantile organ. The man's general condition was good, yet he was somewhat despondent from the poor outlook of having this deformity corrected. He was admitted to a private room in the German Hospital. My first object

was to restore the calibre of the urethra at the seat of the stricture to, or nearly to, its normal calibre, which, when measured with the urethral meter, was found to be 32 French. The location of the stricture did not permit of a dilating internal urethrotomy, neither did I think it wise to cut the stricture with the Maisonneuve urethrotome until I had demonstrated that it would not yield to gradual dilatation. At intervals of three days sounds were passed for two weeks, when I was able to introduce a No. 25 with comparative ease.

While I had a faint hope of bringing about a partial closure at least of the fistula by this treatment, I found that it had no effect. It was therefore left for me, in the light of so many unsuccessful trials having been made, to determine the best procedure to close this abnormal opening. The opening being comparatively easy of access through the rectum, on account of the patulous condition of the anus, I thought it well to attempt its closure by a plastic operation upon the anterior wall of the rectum. Accordingly, the patient having been prepared and anæsthetized, he was brought into the lithotomy position, when, with a Sims's speculum engaged in the rectum, depressing its posterior wall, and a steel sound introduced into the bladder, I operated as if I were closing a vesico-vaginal fistula. After the edges had been freshened and the mucous membrane of the rectum for some little distance beyond the margin of the opening freed from the wall of the urethra and the sutures introduced, I removed the sound and substituted instead an English catheter, which I tied to the penis, and then adjusted the edges of the opening and tied the stitches, thus completing the operation.

This did not bring about a cure. After the period of a few days the patient was again etherized, when I opened the urethra through the middle line of the perineum and dissected out the scar tissue; I also dissected loose the rectum throughout its circumference to a sufficient distance above the seat of the fistulous opening to allow me to bring it down and attach it to the edge of the perineal wound after the latter had been closed, very much after the manner of closing a ruptured perineum in the female. An English catheter was now introduced into the bladder, fixed again to the penis, and allowed to remain for one week. The posterior part of the perineal wound, as well as where the rectum was attached, was now found to be healed. Some hours after the removal of the catheter the patient voided urine through the urethra. I again commenced the passage of steel sounds

at intervals of every three days. The stitches in the perineum were removed at the end of two weeks, when the perineum was found intact, except at the extreme upper part, where there was a fistulous tract through which some urine escaped. This healed completely in the course of three weeks, the passage of the sounds being kept up. After the removal of the catheter there was a constant desire to pass urine, both during the day and night; this I attributed simply to the size as well as the irritable condition of the bladder. The bladder emptying itself constantly since the recurrence of the accident, it could not be expected that an organ trained as this had been could acquire new habits in so short a time. This symptom was so annoying as to make the patient almost prefer his original condition. He was, however, advised to bear this for a while, with the hope that improvement would occur. When he left the hospital he was able to retain his urine as long as three hours.

The patient was now allowed to go home, with the understanding that he was to visit Dr. Crothers once a week and have a 32 sound introduced. Six weeks after his discharge he paid me a visit, when he stated that with the exception of having to urinate a little oftener than natural, he was well, barring one fact—that is—when having nocturnal emissions, the semen did not escape by its natural channel, but through the anus. I believe this to be due most probably to a fistulous communication with the seminal vesicles, and advised him to do nothing for the time being, but report later.

I have thought this case of sufficient importance to report, it being unique in the first place, from the length of time the fistula existed, seven operations—six of which were not successful—having been performed; and, second, from the fact that the seminal emissions escape through the anus. The escape of the semen through the anus suggests the probability of injury to the seminal ducts or the seminal vesicles themselves at the time of the last operation; and, if so, done when freeing the rectum.

AN HISTORICAL SPONGE.

ETHER was first administered at the Massachusetts General Hospital, for the purpose of producing anæsthesia in surgical operations, on October 16, 1846, by Dr. Wm. T. G. Morton, for a patient of Dr. John C. Warren, the senior surgeon of the hospital at that time; and the accompanying drawing is a *fac simile* of the sponge used on that occasion.

The records of the hospital of that date have the following statement: "This case is remarkable in the annals of surgery. It was the first surgical operation performed under the influence of ether. Dr. Warren had been applied to by Dr. Morton, a dentist, with the request that he would try the inhalation of a fluid which he said he had proved to be effectual in preventing pain during operations on the teeth. Dr. Warren having satisfied himself that the breathing of the fluid would be harmless, agreed to employ it when an opportunity presented. None occurring in private practice within a day or two, he determined to use it on this patient.

"Before the operation began some time was lost in waiting for Dr. Morton, and ultimately it was thought he would not appear; at length he arrived and explained his detention by informing Dr. Warren that he had been occupied in preparing his apparatus, which consisted of a tube connected with a glass globe. This apparatus he then proceeded to apply, and after four or five minutes the patient appeared to be asleep and the operation was performed as above described (the removal of a subcutaneous vascular tumor of the neck beneath the margin of the lower jaw). To the surprise of Dr. Warren and the other gentlemen present, the patient did not shriek or cry out; but during the insulation of the veins he began to move his limbs and utter extraordinary expressions. These movements seemed to indicate the existence of pain, but after he had recovered his faculties he said he had experienced none, but only a sensation like that of scraping the part with a blunt instrument, and he ever after continued to say he

had not felt any pain. The result of this operation led to the repetition of the use of ether in other cases, and in a few days its success was established and its use resorted to in every considerable operation in the city of Boston and its vicinity."

Dr. J. Mason Warren, in his *Surgical Observations*, 1867, p. 618, makes the following statement in regard to the sponge, a photograph of which is here given: "Ether was first administered by an apparatus; the use of this was inconvenient, especially with children, and led me to administer it on a simple sponge, which immediately took the place of the apparatus everywhere. The sponge first used at the hospital is still preserved there."

APPENDIX.

FELLOWS OF THE AMERICAN SURGICAL ASSOCIATION, 1880–1892.

FOUNDER.

SAMUEL DAVID GROSS, M.D., LL.D., D.C.L. Oxon., LL.D. Cantab., LL.D. Edin.

OFFICERS.

Presidents.

ELECTED.

1880. Samuel David Gross, M.D., LL.D., D.C.L. Oxon., LL. D. Cantab., LL.D. Edin.
1883. Edward Mott Moore, M.D., LL.D.
1884. William Thompson Briggs, M.D.
1885. Moses Gunn, A.M., M.D., LL.D.
1886. Hunter McGuire, M.D., LL.D.
1887. D. Hayes Agnew, M.D., LL.D
1888. David Williams Cheever, M.D.
1889. David W. Yandell, M.D.
1890. Claudius Henry Mastin, M.D., LL.D.
1891. Phineas Sanborn Conner, M.D., LL.D.
1892. Nicholas Senn, M.D.

Vice-Presidents.

1880. Louis Alexander Dugas, M.D., LL.D.
1880. James Rushmore Wood, M.D., LL.D.
1882. Edward Mott Moore, M.D., LL.D.
1882. Moses Gunn, M.D.
1883. William Wirt Dawson, M.D.

ELECTED.

1883. Claudius Henry Mastin, M.D., LL.D.
1884. Joseph Chrisman Hutchison, M.D., LL.D.,
1884. Elisha H. Gregory, M.D., LL.D.
1885. Christopher Johnston, M.D.
1885. Thomas P. Russell, M.D.
1886. T. F. Prewitt, M.D.
1886. J. W. S. Gouley, M.D.
1887. Nicholas Senn, M.D.
1887. Frederic Shepard Dennis, M.D.
1888. T. G. Richardson, M.D.
1888. John B. Roberts, M.D.
1889. Claudius Henry Mastin, M.D.
1889. C. B. Nancrede, M.D.
1890. John Collins Warren, M.D.
1890. Stephen Smith, A.M., M.D.
1891. Louis McLane Tiffany, A.M., M.D.
1891. Levi Cooper Lane, A.M., M.D.
1892. Charles B. Porter, M.D.
1892. W. W. Keen, M.D.

Secretary.

1880. Jacob Rowland Weist, M.D.

Corresponding Secretary.

1880. William Thompson Briggs, M.D.

Treasurers.

1880. John H. Packard, M.D.
1884. John H. Brinton, M.D.
1886. Phineas Sanborn Conner, M.D., LL.D.
1891. John B. Roberts, M.D.

Recorder.

1881. J. Ewing Mears, M.D.

Members of Council.

1880. Moses Gunn, M.D.
1880. John T. Hodgen, M.D.
1880. Hunter McGuire, M.D.
1880. Robert Alexander Kinloch, M.D.
1880. Joseph Chrisman Hutchison, M.D.
1881. William Thompson Briggs, M.D.
1881. John W. S. Gouley, M.D.

ELECTED.

1882. Richard Beverly Cole, M.D.
1882. George Washington Gay, M.D.
1882. Henry Fraser Campbell, M.D.
1883. Phineas Sanborn Conner, M.D.
1884. John Shaw Billings, U. S. A., M.D., LL.D.
1885. L. McLane Tiffany, A.M. Cantab., M.D.
1888. W. F. Peck, M.D.
1888. Samuel W. Gross, M.D., LL.D.
1889. Frederic Shepard Dennis, M.D.
1890. Stephen H. Weeks, M.D.
1891. Claudius Henry Mastin, M.D., LL.D.
1892. Roswell Park, M.D.
1892. Robert F. Weir, M.D.

ORIGINAL FELLOWS.

DATE.	NAME.	RESIDENCE.
1880.	Ashhurst, John, Jr.,	Philadelphia, Pa.
1880.	Benham, Silas Nelson,	Pittsburg, Pa.
1880.	Bramble, D. D.,	Cincinnati, O.
1880.	Briggs, William Thompson,	Nashville, Tenn.
1880.	Brinton, John H.,	Philadelphia, Pa.
1880.	Brock, Hugh W.,	Morgantown, W. Va.
1880.	Byrd, William Andrew,	Quincy, Ill.
1880.	Cabell, James L.,	University of Virginia, Va.
1880.	Campbell, Henry Fraser,	Augusta, Ga.
1880.	Coleman, John Scott,	" "
1880.	Conner, Phineas Sanborn,	Cincinnati, O.
1880.	Davis, Samuel T.;	Lancaster, Pa.
1880.	Dawson, William Wirt,	Cincinnati, O.
1880.	Dugas, Louis Alexander,	Augusta, Ga.
1880.	Gouley, J. W. S.,	New York, N. Y.
1880.	Greene, W. Warren,	Portland, Maine.
1880.	Gross, Samuel D.,	Philadelphia, Pa.
1880.	Gross, Samuel W.,	" "
1880.	Gunn, Moses,	Chicago, Ill.
1880.	Hodge, H. Lenox,	Philadelphia, Pa.
1880.	Hodgen, John T.,	St. Louis, Mo.
1880.	Hughes, J. C.,	Keokuk, Ia.
1880.	Hutchison, Joseph Chrisman,	Brooklyn, N. Y.
1880.	Johnston, Christopher,	Baltimore, Md.
1880.	Keen, William Williams,	Philadelphia, Pa.
1880.	Keller, James McDonald,	Hot Springs, Ark.

DATE.	NAME.	RESIDENCE.
1880.	Kinloch, Robert Alexander,	Charleston, S. C.
1880.	Levis, Richard J.,	Philadelphia, Pa.
1880.	McGuire, Hunter,	Richmond, Va.
1880.	Marks, Solon,	Milwaukee, Wis.
1880.	Mastin, Claudius Henry,	Mobile, Ala.
1880.	Mears, J. Ewing,	Philadelphia, Pa.
1880.	Moore, Edward Mott,	Rochester, N. Y.
1880.	Morton, Thomas George,	Philadelphia, Pa.
1880.	Packard, John H.,	" "
1880.	Pancoast, William Henry,	" "
1880.	Pollock, Alexander M.,	Pittsburg, Pa.
1880.	Richardson, Tobias G.,	New Orleans, La.
1880.	Russell, Thomas Pember,	Oshkosh, Wis.
1880.	Sayre, Lewis Albert,	New York, N. Y.
1880.	Swinburne, John,	" "
1880.	Tremaine, William S.,	Buffalo, N. Y.
1880.	Wales, Philip Skinner,	Washington, D. C.
1880.	Weist, Jacob Rowland,	Richmond, Ind.
1880.	Westmoreland, W. F.,	Atlanta, Ga.
1880.	Wood, James R.,	New York, N. Y.
1880.	Yardell, David W.,	Louisville, Ky.

ACTIVE FELLOWS ELECTED.

ELECTED.	NAME.	RESIDENCE.
1890.	Abbe, Robert,	New York, N. Y.
1882.	Agnew, D. Hayes,	Philadelphia, Pa.
1890.	Allis, Oscar H.,	" "
1882.	Barton, James M.,	" "
1882.	Billings, John Shaw,	Washington, D. C.
1882.	Bontecou, Reed Brockway,	Troy, N. Y.
1882.	Bozeman, Nathan,	New York, N. Y.
1890.	Bradford, E. H.,	Boston, Mass.
1882.	Bull, William Tillinghast,	New York, N. Y.
1889.	Cabot, Arthur T.,	Boston, Mass.
1885.	Carmalt, William,	New Haven, Conn.
1882.	Cheever, David Williams,	Boston, Mass.
1881.	Cole, Richard Beverly,	San Francisco, Cal.
1882.	Comingor, John A.,	Indianapolis, Ind.
1882.	Cunningham, Francis Deane,	Richmond, Va.
1883.	Dandridge, N. P.,	Cincinnati, O.
1882.	Davis, J. S.,	University of Virginia, Va.
1892.	Deaver, John B.,	Philadelphia, Pa.

ELECTED.	NAME.	RESIDENCE.
1882.	Dennis, Frederic Shepard,	New York, N. Y.
1882.	Detmold, William,	" "
1882.	Dunott, Thomas J.,	Harrisburg, Pa.
1883.	Fenger, Christian,	Chicago, Ill.
1882.	Fifield, William Cranch Bond,	Boston, Mass.
1882.	Forbes, William Smith,	Philadelphia, Pa.
1891.	Fowler, George R.,	Brooklyn, N. Y.
1882.	Gay, George Washington,	Boston, Mass.
1890.	Gerster, Arpad G.,	New York, N. Y.
1882.	Gregory, Elisha H.,	St. Louis, Mo.
1892.	Halsted, William S.,	Baltimore, Md.
1882.	Hewson, Addinell,	Philadelphia, Pa.
1889.	Homans, John,	Boston, Mass.
1882.	Isham, R. N.,	Chicago, Ill.
1889.	Lane, Levi Cooper,	San Francisco, Cal.
1889.	Lange, Frederick E.,	New York, N. Y.
1882.	Little, J. L.,	" "
1892.	McBurney, Charles,	New York, N. Y.
1883.	McCann, James,	Pittsburg, Pa.
1882.	McGraw, Theodore A.,	Detroit, Mich.
1882.	Maclean, Donald,	Detroit, Mich.
1882.	McLean, Le Roy,	Troy, N. Y.
1883.	Markoe, Thomas Masters,	New York, N. Y.
1887.	Mastin, William McDowell,	Mobile, Ala.
1885.	Michael, Jacob Edwin,	Baltimore, Md.
1886.	Mudd, H. H.,	St. Louis, Mo.
1882.	Nancrede, Charles Beylard,	Ann Arbor, Mich.
1882.	Norris, Basil,	Washington, D. C.
1882.	Owens, John E.,	Chicago, Ill.
1885.	Park, Roswell,	Buffalo, N. Y.
1882.	Parkes, Charles T.,	Chicago, Ill.
1883.	Peck, Washington F.,	Davenport, Ia.
1889.	Pilcher, Lewis S.,	Brooklyn, N. Y.
1887.	Porter, Charles Burnham,	Boston, Mass.
1882.	Porter, William Gibbs,	Philadelphia, Pa.
1882.	Prewitt, Theodore F.,	St. Louis, Mo.
1882.	Prince, David,	Jacksonville, Ill.
1886.	Ransohoff, Joseph,	Cincinnati, O.
1882.	Reed, Thomas B.,	Philadelphia, Pa.
1887.	Richardson, Maurice Howe,	Boston, Mass.
1882.	Roberts, John B.,	Philadelphia, Pa.
1882.	Rushmore, John Dikeman,	Brooklyn, N. Y.
1882.	Sabine, Thomas Taunton,	New York, N. Y.

ELECTED.	NAME.	RESIDENCE.
1882.	Senn, Nicholas,	Chicago, Ill.
1882.	Smith, Alan Penniman,	Baltimore, Md.
1882.	Smith, Stephen,	New York, N. Y.
1882.	Squire, T. H.,	Elmira, N. Y.
1889.	Stimson, Lewis A.,	New York, N. Y.
1883.	Taylor, William Edwin,	San Francisco, Cal.
1885.	Thompson, J. Ford,	Washington, D. C.
1882.	Thompson, J. W.,	Paducah, Ky.
1882.	Thomson, William,	Philadelphia, Pa.
1882.	Tiffany, Louis McLane,	Baltimore, Md.
1882.	Vander Veer, Albert,	Albany, N. Y.
1885.	Varick, Theodore R.,	Jersey City, N. J.
1891.	Walker, Edward W.,	Cincinnati, O.
1882.	Warren, John Collins,	Boston, Mass.
1882.	Watson, B. A.,	Jersey City, N. J.
1889.	Weeks, Stephen H.,	Portland, Me.
1889.	Weir, Robert F.,	New York, N. Y.
1892.	Wharton, Henry R.,	Philadelphia, Pa.
1882.	White, J. William,	" "
1891.	Wight, Jarvis Sherman,	Brooklyn, N. Y.
1882.	Willard, DeForest,	Philadelphia, Pa.

FELLOWS RESIGNED.

NAME.	DATE OF RESIGNATION.
Bozeman, Nathan,	May, 1887.
Cabell, James L.,	September, 1888.
Coleman, J. S.,	May, 1890.
Detmold, William,	September, 1888.
Fifield, William C.,	" "
Hutchison, J. C.,	May, 1887.
Maclean, Donald,	May, 1890.
Peters, George A.,	June, 1883.
Wales, P. S.,	May, 1887.

FELLOWSHIP FORFEITED.

NAME.	DATE FORFEITED.
Cole, R. Beverly,	May, 1887.
Davis, S. T.,	" 1890.
Fenger, C.,	" "
Gouley, J. W. S.,	" "

NAME.	DATE FORFEITED.
Hewson, A.,	May, 1887.
Keller, J. M.,	" "
McLean, Leroy,	" 1890.
Pollock, A. M.,	" "
Swinburne, John,	September, 1888.
Westmorland, W. F.,	" "

FELLOWS DECEASED.

NAME.	DATE OF DEATH.
Agnew, D. Hayes,	March 22, 1892.
Benham, Silas Nelson,	November 3, 1890.
Brock, Hugh W.,	April 24, 1882.
Byrd, William Andrew,	August 14, 1887.
Campbell, Henry Fraser,	December 15, 1891.
Cunningham, Francis Deane,	September 11, 1885.
Davis, John Staige,	July 18, 1885.
Dugas, Louis Alexander,	October 19, 1884.
Greene, W. Warren,	September 10, 1881.
Gross, Samuel David,	May 6, 1884.
Gross, Samuel Weissel,	April 16, 1889.
Gunn, Moses,	November 4, 1887.
Hodge, H. Lenox,	June 16, 1881.
Hodgen, John T.,	April 28, 1882.
Hughes, J. C.,	August 10, 1881.
Johnston, Christopher,	October 11, 1891.
Kinloch, Robert Alexander,	December 23, 1891.
Levis, Richard J.,	November 12, 1890.
Little, James Lawrence,	April 4, 1885.
Parkes, Charles T.,	March 28, 1891.
Peck, Washington F.,	December 12, 1891.
Prince, David,	December 19, 1889.
Reed, Thomas Baird,	April 1, 1891.
Richardson, Tobias G.,	May 26, 1892.
Sabine, Thomas Taunton,	August 23, 1888.
Squire, Truman Hoffman,	November 27, 1889.
Thompson, Joseph W.,	March 30, 1886.
Varick, Theodore Romeyn,	November 23, 1887.
Wood, James R.,	May 4, 1882.

HONORARY FELLOWS.

DATE.	NAME.	RESIDENCE.
1885.	Annandale, Thomas,	Edinburgh, Scotland.
1882.	Atlee, John L.,	Lancaster, Pa.
1886.	Bigelow, Henry J.,	Boston, Mass.
1885.	Billroth, Theodor,	Vienna, Austria.
1891.	Bryant, Thomas,	London, England.
1891.	Chiene, John,	Edinburgh, Scotland.
1885.	Czerny, Vincenz,	Heidelberg, Germany.
1891.	Durham, Arthur Edward,	London, England.
1885.	Erichsen, John Eric,	" "
1891.	Harrison, Reginald,	" "
1890.	Horsley, Victor,	" "
1882.	Horwitz, P. J.,	Philadelphia, Pa.
1882.	Hunt, William,	" "
1885.	Lister, Sir Joseph,	London, England.
1886.	MacCormac, Sir William,	" "
1887.	Ollier, Dr. Leopold,	Lyons, France.
1885.	Paget, Sir James,	London, England.
1882.	Parker, Willard,	New York, N. Y.
1882.	Post, Alfred C.,	" "
1882.	Sims, J. Marion,	" "
1885.	Verneuil, A.,	Paris, France.
1885.	von Esmarch, Friedrich,	Kiel, Germany.
1886.	von Langenbeck, Bernhardt,	Wiesbaden, Germany.
1885.	von Nussbaum, J. N.,	Munich.
1885.	von Volkmann, Richard,	Halle, Germany.

HONORARY FELLOW RESIGNED.

NAME.	DATE OF RESIGNATION.
Post, Alfred C.,	September, 1888.

HONORARY FELLOWS DECEASED.

NAME.	DATE OF DEATH.
Atlee, John Light,	October 1, 1885.
Bigelow, Henry Jacob,	October 30, 1890.
Parker, Willard,	April 25, 1884.
Sims, J. Marion,	November 13, 1883.
von Langenbeck, Bernhardt,	September 30, 1887.
von Nussbaum, J. N.,	October 31, 1890.
von Volkmann, Richard,	November 28, 1889.

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